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THE TYPHUS GROUP OF FEVERS

CLASSIFICATION, LABORATORY DIAGNOSIS, PROPHYLACTIC INOCULATION, AND SPECIFIC SERUM TREATMENT*

BY

A. FELIX, D.Sc.

(From the Emergency Public Health Laboratory Service)

The "typhus group of fevers," comprising a number of different varieties of the disease, is now firmly established. Typhus researches during the past few years have revealed the occurrence of typhus-like diseases in many parts of the world. Not a few endemic diseases of various tropical and subtropical countries, some of which had long been known under the label "unclassed fevers," have now been recognized as members of the typhus fever group. This recent development is mainly due to the application of serological and immunological methods to the study of these diseases. The so-called Weil-Felix reaction has provided in almost every instance the first evidence of the generic relationship of the unknown disease to classical louse-borne typhus, and thus opened the way for the experimental study which has led to the demonstration of the corresponding rickettsia. Some of the best-known instances of this sequence of events are: the endemic typhus of the United States of America (Maxcy and Havens, 1923); the tropical typhus of the Federated Malay States (Fletcher and Lesslar, 1925); the "fièvre exanthématique" of Marseilles, and "fièvre boutonneuse" of Tunis (Burnet and Olmer, 1927; Felix and Rhodes, 1931; Durand, 1932); São Paulo typhus (Piza *et al.*, 1931; Monteiro, 1931; Felix, 1933a); and the tick-bite fever of South Africa (Pijper and Dau, 1930, 1931, 1932).

The terms "rickettsial infections" and "typhus group of fevers" are not synonymous, the former being much wider than the latter. If the rickettsial infections that occur in certain domestic animals are excluded and only those that affect man are considered, there still remain some rickettsial diseases of man which, according to our present knowledge, seem to be unrelated to the typhus group of fevers. Among these diseases may be mentioned the "Q" fever of Queensland (Derrick, 1937; Burnet and Freeman, 1937) and of certain parts of the U.S.A. (Davis, Cox, Parker, and Dever, 1938), and the "trench fever" which became known in 1916 as a wartime infection but has not again made its appearance in epidemic form, even during the present war.

Classification

Megaw (1921, 1930) was the first to attempt to classify the typhus-like fevers as members of one group of diseases and suggest a subdivision according to the transmitting insect vector. The suggestion was undoubtedly a step in the right direction, and so long as the group was composed of only a few diseases the differentiation according to vector seemed to fit the known facts. This, however, no longer holds good.

A satisfactory classification of the typhus group can be based solely on the antigenic type of the corresponding rickettsiae, upon which immunity and immunity reactions depend. The antigenic analysis of the various typhus rickettsiae has, however, not yet passed its infancy. The most widely studied of these organisms is *R. prowazeki*, the causal organism of Old World and New World typhus of type X 19. It is known that *R. prowazeki* possesses a heat-labile and a heat-stable antigen (Castaneda and Zia, 1933), that the latter is common to *R. prowazeki* and *Proteus* OX 19 (Weil and Felix, 1921), and that this O antigenic component is alkali-stable (Bruce White, 1933). The antigenic structure of the rickettsiae of the other varieties of typhus and their relationship to each other have not been studied as yet, owing to the great difficulty in obtaining pure suspensions of rickettsiae in sufficiently large quantities. This difficulty has been overcome only quite recently, thanks to the discovery of two methods of growing rickettsiae—namely, in the yolk sac of the developing chick (Cox, 1938) and in the lungs of infected rats and mice (Castaneda, 1939). There is good reason for believing that as a result of these important advances the gaps in our knowledge will be filled very soon.

So far the serology of the typhus group has been based on the antigenic relationship between the rickettsiae of the different varieties of the disease and corresponding serological varieties of *Proteus* X. This relationship is most strikingly demonstrated by the close correlation between cross-immunity and agglutination reactions with the three types of *Proteus* X

TABLE I.—*Provisional Classification of the Typhus Group of Fevers*

Immunological Subgroup	Type OX 19	Type OX K	Type undetermined
Name of disease..	Classical epidemic typhus Tabardillo (Mexico) Brill's disease (U.S.A.) Endemic typhus of U.S.A. and Australia, Greece, Syria, Manchuria, Malay (shop typhus), India, Burma, Philippines, Hawaii, Toulon (fièvre nautique), etc.	Tsutsugamushi fever of Japan, Formosa, Malay, and Dutch East Indies Scrub typhus of Malay, Dutch East Indies, India, French Indo-China, Australia	Spotted fever of Rocky Mountains Spotted fever of eastern U.S.A. São Paulo typhus Fièvre boutonneuse (Mediterranean) Fièvre exanthématique of Marseilles Febbre errutiva (Italy) Tick-bite fever of South Africa Epidemic and endemic typhus of South Africa Tick-borne typhus of India, Kenya, etc.
Vector ..	Lice and rat fleas	Mites	Ticks, lice, and rat fleas
Reservoir of virus	Rats. Man	Field mice and rats	Rodents. Dogs. ? Ticks. Man
Agglutination ..	OX 19 +++ OX 2 + OX K −	OX 19 − OX 2 − OX K +++	OX 19 + OX 2 + OX K +

* A report to the Medical Research Council.

strains, known as OX 19, OX 2, and OX K (Felix, 1933b). The conception of serological varieties of typhus, based on the work of Fletcher and Lesslar (1925) and formulated by Felix and Rhodes (1931), led to the subdivision of the typhus group into three immunological subgroups.

Table I shows that the suggested scheme (Felix, 1935) comprises at present only two well-defined main types—namely, types OX 19 and OX K. The third subgroup, provisionally designated "type undetermined," probably contains several different types. Further subdivision will be made possible by the use of pure cultures of the corresponding rickettsiae, which will disclose the interrelationships of both the heat-stable and the heat-labile rickettsial antigens.

The most important of these diseases is the louse-borne typhus of type OX 19, known as the classical epidemic typhus and caused by *R. prowazeki*. The subsequent sections of this paper deal mainly with this variety of the disease, though some of the conclusions are applicable also to the other typhus-like fevers. A few remarks on nomenclature may not be out of place here. In the past some confusion has arisen from the tendency to use a number of different names to designate the same disease. In recent papers published in this country (Findlay, 1941a, 1941b) this tendency has reappeared, and the louse-borne epidemic typhus has been given a new name—viz., "exanthematic" typhus. It cannot be said that there was need of a new name. The one chosen by Findlay certainly does not offer any advantage over the generally accepted old names. There is nothing distinctive in the name "exanthematic" typhus, since all the varieties of typhus are exanthematous diseases. Louse-borne typhus occurs as an endemic disease in many parts of the world, but gives rise to widespread epidemics only under exceptional conditions, chiefly in the wake of war, famine, or other major disasters that favour louse-infestation. The term "louse-borne typhus," used throughout this paper, applies to both the epidemic and the endemic form of the disease.

Laboratory Diagnosis

The clinical diagnosis of typhus is not altogether easy, so that early guidance is sought from laboratory findings. The following laboratory methods of diagnosing typhus infections have been suggested at one time or another: biopsy of skin lesions, with a view to demonstrating typhus nodules or rickettsiae; inoculation of the patient's blood into guinea-pigs or other laboratory animals; serological tests. The latter alone have proved to be of practical importance. It is, of course, theoretically possible to diagnose a typhus case by isolation of rickettsiae from the patient's blood or from the insect vector, when this has been found on the patient. It is, however, a mistake to recommend these methods for diagnostic purposes (Army Pathology Laboratory Service, Current Notes, 1941). These complicated and rather dangerous procedures would hardly ever enable the pathologist to aid the clinician in diagnosing a case of typhus fever.

Fortunately, the isolation of rickettsiae is not necessary, since the diagnosis of typhus can be confirmed by a relatively simple serological test. The Weil-Felix reaction has been employed for the purpose during the past 25 years. The limited space here available precludes discussion of the technique of the test, its application by the clinician and epidemiologist, its limitations, and the interpretation of results, but it can be stated that practical experience on a very large scale has shown that the *Proteus* OX 19 reaction is the most constant sign of louse-borne typhus; the clinical symptoms, on the other hand, may show very wide variations.

Experiments on agglutination of rickettsial suspensions have been carried out ever since Weigl (1923, 1930) first obtained fairly concentrated suspensions by his method of anal infection of lice, and Zinsser and Castaneda (1932) by intraperitoneal infection of *x*-rayed rats. These experiments, though of outstanding importance in typhus research, have not so far made it possible to adopt agglutination tests with rickettsiae as a routine method of diagnosing typhus cases. The microscopical technique gives unsatisfactory results, while the macroscopic technique requires relatively large quantities of rickettsial suspensions, which can be more usefully employed for the preparation of vaccines. The most recent advances in growing rickettsiae (Cox, 1938; Castaneda, 1939) have not, for the time being at any rate, materially altered the position.

The published data on the agglutination of *R. prowazeki* by the serum of typhus patients and convalescents present a rather confusing picture. Some workers have reported almost complete parallelism between agglutination of *R. prowazeki* and *Proteus* OX 19 (Weigl, 1930; Zinsser and Castaneda, 1932), whereas others obtained quite different results (Liu, Zia, and Wang, 1938; Hudson, 1940). Obviously the confusion is due to the fact that agglutination of rickettsiae can be adequately described only in terms of two separate reactions—namely, those which occur between the heat-labile and the heat-stable antigens and their respective antibodies. According to Castaneda and Zia (1933), living or formolized rickettsiae are not agglutinated by the OX 19 antibody, but become agglutinable after heating at 75° C.; phenol seems to produce a similar effect to heat. Differently prepared rickettsial suspensions, such as have been employed by various workers, do not therefore indicate the same antigen-antibody reaction when tested against typhus sera that contain, or may contain, the two different antibodies.

What has been said about agglutination of rickettsiae applies also to complement-fixation with these organisms (Castaneda, 1936b; Mosing, 1938; Bengtson, 1941; Bengtson and Topping, 1941). Either of the two reactions may be used for the demonstration of the antibody corresponding to the heat-labile rickettsial antigen provided that a technique is devised by means of which the heat-stable O antigen is precluded from taking part in the reaction and thus obscuring the results.

Although the technique of the customary test-tube agglutination with *Proteus* OX 19 is very simple, still simpler procedures have been adopted by workers in the U.S.A. (Welch, 1937) and in Mexico (Castaneda *et al.*, 1940) in the form of slide agglutination tests. German workers even employ a slide test using dried drops of whole blood instead of the separated serum. Extensive surveys are being carried out by this method in endemic areas in occupied Poland, with a view to detecting missed ambulatory patients and cases of so-called inapparent infection. The latter cases are of special epidemiological importance since they do not show any clinical symptoms whatever, but are capable of infecting lice and spreading the disease. The dry-drop blood tests are carried out within a few minutes even under the most primitive conditions, and it is claimed that the results compare favourably with those obtained with test-tube agglutination (Eyer and Grützner, 1939-40; Steuer, 1942).

Immunity to Typhus in Relation to the Known Antigenic Constituents of Rickettsia

Immunity to typhus has been studied in experimental animals for the past 30 years, but is as yet very incompletely understood. The main obstacles to progress have been, and still are, lack of knowledge of the essential antigens of the causal organism and lack of a suitable experimental animal. Most of the work has been done on guinea-pigs and rabbits; more recently rats and mice have come into use. In none of these animals, however, does typhus infection run a course comparable to the disease in man. Only the chimpanzee reacts with symptoms similar to those of a mild case in the adult man. Monkeys of the various lower genera so far tested do not offer any advantage over the guinea-pig as test animal. Quite recently the Eastern cotton rat of the U.S.A. (Snyder and Anderson, 1942) and the common gerbil of South Africa (Gear and Davis, 1942) have been suggested as more susceptible animals, and are now being tried out.

It has been known for a long time that immunity to typhus is complex—that is to say, it is related to more than one antigenic constituent of the causal organism. The O antigen of *Proteus* X 19, which corresponds to the heat-stable antigen of *R. prowazeki*, does not induce immunity to experimental typhus infection, and the corresponding O antibody, though so valuable in diagnosis, does not account for the protective action of convalescent serum from man and animals. A clue to this puzzling problem has been provided by the work of Castaneda (1934, 1935, 1936a, b, c), who showed that *Proteus* OX 19 immune serum reacts with rickettsia only in agglutina-

tion, precipitation, and complement fixation, but is inactive in opsonization. It is the antibody to the heat-labile rickettsial antigen that is of outstanding importance in phagocytosis of *R. prowazeki* and in protection against infection with this organism.

It would be wrong, however, to conclude from these experiments that the heat-stable O antigen and its corresponding antibody are not concerned in typhus immunity, because a glance at Table I shows that they are. Cross-immunity between different varieties of typhus rickettsiae is accompanied by identity of the serum reactions to the O antigen of the corresponding *Proteus* X strains, whereas failure to obtain cross-protection coincides with dissimilarity in O agglutination reactions. The results of cross-immunity tests can thus be predicted from the O agglutination tests obtained with various types of *Proteus* X, and have in fact been so predicted (Felix, 1933b). It is also well established that there are two types of the curve of OX 19 agglutinin production in typhus patients, and that these are related to the clinical course of the disease (for references see Felix, 1930).

These facts can be reconciled with Castaneda's findings if it is assumed that the labile antigen of *R. prowazeki* plays a part similar to that of the labile somatic antigen of the typhoid bacillus, known as the Vi antigen. The analogy between the two is indeed very striking, for the typhoid O antigen alone is incapable of inducing in animals effective immunity to infection with virulent Vi + O bacilli, but the Vi antigen is. And, again, typhoid Vi antibody is a powerful opsonizing agent for Vi + O bacilli, but the O antibody is not. *R. prowazeki* and *Bact. typhosum* also show close similarity in the agglutinative properties of their somatic antigens. Living and formolized suspensions of both organisms are not agglutinated by their respective O antibodies but become agglutinable after heating. Breinl (1924) showed that the O antigen of *R. prowazeki* from the louse gut retains its agglutinogenic property after heating at 100° C., as do O antigens generally.

It seems, therefore, quite natural to assume that the O antigen of *R. prowazeki* plays a part similar to that of the O antigen of the typhoid bacillus and other Salmonellas, and of other organisms—namely, that of acting as an endotoxin. The corresponding OX 19 antibody would thus function as an anti-endotoxin (Boivin and Mesrobeanu, 1933; Raistrick and Topley, 1934; Felix and Pitt, 1934). Strong evidence in support of this view is provided by the clear-cut results of intradermal tests with heat-killed suspensions of *Proteus* OX 19 (Friedberger and van der Reis, 1919) or with extracts prepared from *Proteus* OX 19 (Fleck, 1931). In normal persons and non-typhus patients the intradermal injection of OX 19 antigen produces a local inflammatory reaction, reaching its maximum after 24 to 36 hours. Typhus patients react in a similar manner during the first few days of illness, but from the fifth or sixth day onwards the reaction is negative and remains so throughout convalescence and for varying periods, up to several months, after recovery. This period coincides with the presence in the serum of OX 19 agglutinins in significant titre. The toxicity to man of the OX 19 antigen and the specific neutralization of its toxic action as a result of recovery from typhus infection are thus clearly demonstrated.

The latest development in the study of typhus immunity is the demonstration by German workers of a heat-labile rickettsial endotoxin which is lethal to mice and specifically neutralized by convalescent serum from man and animals (Gildemeister and Haagen, 1940; Otto and Bickhardt, 1941). The lability of this toxic substance is much the same as that of the heat-labile rickettsial antigen described by Castaneda, and it seems very likely that the two are identical.

It would appear, therefore, that in two widely separated organisms, such as the typhoid bacillus and the strictly intracellular virus-like *R. prowazeki*, the mechanisms of infection and immunity are in principle very much alike. In both cases a heat-labile somatic antigen, besides acting as a toxic substance, inhibits the interaction between the O antigen and the O antibody, and thus protects the bacterial, or rickettsial, cell against the opsonizing and bactericidal actions of the natural and immune O antibody. It is not suggested that these are the sole factors associated with immunity to typhus. Antibodies to yet other, still unknown, constituents of the rickettsial cell may also play a part. But it is obvious that the two rickettsial antigens and antibodies that have so far been defined are essential elements in immunity to typhus.

Specific Serum Treatment

Specific serum treatment of typhus fever of recognized value has not yet been evolved, and attempts at chemotherapy so far have also been unsuccessful. One of the German typhus experts working in Warsaw since 1940 recently reported that trials with nearly 100 different drugs, including 24 sulphonamide compounds, gave only negative results (Wohlrab, 1942). French workers who have had many years' experience of louse-borne typhus in Tunis consider treatment with sulphapyridine not only useless but even harmful (Durand and Balozet, 1941).

Convincing therapeutic effects have not been observed with convalescent serum, although such sera usually exert a definite prophylactic action when tested on the guinea-pig. Wohlrab (1942) found pooled convalescent serum ineffective not only in the treatment of typhus cases but even as a prophylactic when employed during a prison epidemic in Poland.

Durand and Balozet (1941) treated a series of 120 cases of louse-borne typhus in Tunis with serum from horses immunized with living rickettsiae from infected mouse lung and believed that they obtained evidence of its beneficial effects. It is, however, rather disappointing to note from their paper that only the indigenous patients seemed to respond to the treatment, while the European patients did not. Wyckoff and Bohnel (1942), using a strongly concentrated serum from immunized rabbits, described therapeutic effects in guinea-pigs infected with louse-borne typhus. The data published by these workers do not, however, warrant their conclusion, since the serum was in each instance administered before the onset of fever. The present position, therefore, is that there is no convincing evidence of the curative action of the so-called therapeutic sera, although their prophylactic value in animal experiments has been established beyond doubt.

In the light of the facts discussed in the preceding section it would appear that the efficacy of a therapeutic anti-typhus serum depends upon the presence in it of effective amounts of the two different antibodies corresponding to the heat-labile and heat-stable rickettsial antigens. It is, however, quite clear that sera of this kind have not yet been employed in the treatment of typhus patients. Convalescent sera cannot be obtained sooner than two or three weeks after defervescence, by which time the OX 19 titre has fallen to a mere fraction of its maximum value. In louse-borne typhus this maximum is usually reached a day or two before or after the first day of defervescence. There can be little doubt also as to the deficiency in O antibody content of the therapeutic immune sera so far prepared. Durand and Balozet (1940) showed that prolonged hyperimmunization of horses and donkeys in no instance resulted in an increase in the low-titre OX 19 antibody which each of the animals had developed at the very beginning of the immunization. While the titre of the neutralizing antibody rose that of the OX 19 antibody fell, although the doses injected contained enormous numbers of rickettsiae.

TABLE II.—*Showing OX 19 Agglutinin Titres of Therapeutic Anti-typhus Sera and Sera from Horses Immunized with Proteus OX 19 Antigen*

Serum	Antigen used for Immunization	OX 19 Agglutinin Titre
Anti-typhus serum (horse) (Durand and Balozet, 1940)	*R. prowazeki* from mouse lung. Tunisian louse-borne strain	1 : 100
Anti-typhus serum (rabbit, concentrate) (Wyckoff and Bohnel, 1942)	*R. prowazeki* from egg-yolk sac. European louse-borne strain	1 : 30
Horse 1	*Proteus* OX 19 alkali-treated	1 60,000
„ 2	„	1 : 40,000
„ 3	„	1 : 20,000
„ 4	„	1 : 5,000

This difficulty may possibly be overcome by producing the O antibody by immunization with the O antigen of *Proteus* X 19. Horses are now being immunized at the serum depart-

ment of the Lister Institute at Elstree in collaboration with Dr. G. F. Petrie. The immunizing material was designed to contain in concentrated form the alkali-stable O antigen of *Proteus* X 19, which, according to Bruce White (1933), is common to both *R. prowazeki* and *Proteus* X 19. Table II shows the OX 19 titres of the serum from horses immunized in this way. For comparison the OX 19 titres of the therapeutic sera prepared by Durand and Balozet (1940) and by Wyckoff and Bohnel (1942) have also been included in the table.

Three of the four horses immunized with OX 19 antigen developed titres higher than those usually met with in recovered typhus patients. The titres also compare favourably with the titre of the typhoid O antibody in therapeutic anti-typhoid serum (Felix and Petrie, 1938). It is known that the strong antitoxic activity of anti-typhoid Vi + O serum is mainly due to its anti-O component, and it seems worth while trying whether a potent OX 19 immune serum will exert a similar effect in cases of typhus fever.

It is hoped that a supply of this serum will shortly be available for clinical trial along with anti-rickettsia serum. Evidence of the efficacy of such treatment cannot be obtained from animal tests, since none of the experimental animals develops toxic symptoms comparable to those of louse-borne typhus in man. Anti-OX 19 serum should, of course, be tried in combination with anti-rickettsia serum containing neutralizing antibody in high titre. The relative importance of the effects of each of the two antibodies on the course of the disease can be assessed only by clinical trials on typhus patients.

Prophylactic Immunization

Immunization against louse-borne typhus is still in the experimental stage. It is only two or three years since methods of growing rickettsiae in large quantities have been developed. Vaccine made from the gut of infected lice (Weigl, 1930) is the only type of killed typhus vaccine that has, so far, passed its test for efficacy in the field. Unfortunately this vaccine is too difficult to make on a large scale. Most of the workers in America favour the use of rickettsiae grown in the yolk sac of developing chick embryos (Cox, 1938); French workers follow the method of Castaneda (1939) and grow the rickettsiae in the lung of infected mice or rabbits (Durand and Giroud, 1940). In Germany all three techniques are apparently employed.

A number of other problems of importance still remain to be solved before typhus vaccines of maximum prophylactic value can be obtained. One of these is the question how the labile rickettsial antigen can best be maintained in the cultures. The best methods of killing and preserving the vaccines have also yet to be found. At present phenol and formalin are employed. It is known that typhoid vaccines prepared in this way do not contain the labile Vi antigen in its most efficient form (Felix, Rainsford, and Stokes, 1941), and it is quite probable that the labile rickettsial antigen also is damaged by phenol and formalin.

The customary methods of testing the efficacy of typhus vaccines are active immunization of guinea-pigs and tests for OX 19 and neutralizing antibodies in the serum of inoculated subjects. It is not advisable to rely on any one of these tests as the sole method of assay. All three types of test should be employed when differently prepared vaccines are compared.

Tests of OX 19 agglutinin response were recently carried out on a number of volunteers in this country. The subjects were members of selected hospital staffs and sanitary personnel who were being inoculated under a scheme organized by the Ministry of Health in consultation with the Medical Research Council.* The immunizing course consisted in each instance of three doses of the size recommended by the various laboratories issuing the vaccines. Each volunteer had a sample of blood withdrawn before receiving the first dose of vaccine; a second sample was taken a fortnight after the third dose. Any rise in OX 19 agglutinin titre of 100% or more was taken to be a "significant" increase in antibody content. The results are summarized in Table III.

* Ministry of Health Memo. 252/Med., p. 3, para. 4.

The table shows that the antigenic value of the various vaccines, as judged by the O antibody response, differed very much. Rabbits injected intravenously with the same vaccines failed to disclose any significant difference; all responded with OX 19 antibody formation.

TABLE III.—*Showing the OX 19 Agglutinin Response in Volunteers Inoculated with Various Typhus Vaccines. (Nov., 1941, to March, 1942)*

Vaccines			Number Inoculated	Number and Percentage showing Significant Rise in OX 19 Agglutinin Titre	
Batch	Prepared from Rickettsiae grown in	Prepared or Issued		No.	%
A	Yolk sac. European louse-borne strain	Oct., 1940	68	3	4.4
B	" "	10/5/41	144	25	17·3
C	" "	4/11/41	125	62	49·6
D	Mouse lung. Tunisian louse-borne strain. (Dr. G. M. Findlay)	1/11/41	16	3	18·7
E	Rat lung. American murine strain	Date of expiry, April, 1943	12	0	0

Neutralization tests of the sera from the various vaccine groups have not yet been carried out, but it is hoped the results will be available for publication at a later date. It is possible that phagocytosis tests may eventually be employed for the quantitative estimation of the antibody to the labile rickettsial antigen, since the O antibody, according to Castaneda (1936a), does not take part in the opsonization of *R. prowazeki*.

Recent reports from Germany emphasize the fact that a death from louse-borne typhus has not yet been recorded in a patient who had been fully immunized with Weigl's vaccine. Very encouraging results also have been obtained in Rocky Mountain spotted fever, the most malignant variety of typhus, by the use of a similar vaccine prepared from infected ticks. Parker (1941), summarizing the results of 15 years' experience of his tick vaccine, showed that the case-fatality rate was 82.3% in non-vaccinated cases in adults but only 8.1% in fully vaccinated cases. Unsuccessful vaccination experiments of earlier workers seemed to suggest that the rickettsiae in the arthropod vector may have some peculiar properties which rickettsiae in the tissues of man and mammals do not possess. It now appears to be likely that the differences are quantitative rather than qualitative: If this is so, one is justified in expecting *R. prowazeki* from animal tissue to yield vaccines of an efficacy equal to that of Weigl's louse vaccine.

Summary

The serological diagnosis and the classification of the fevers of the typhus group are based, so far, on the heat-stable O antigen which is common to the various types of *Rickettsia* and the corresponding types of *Proteus* X. Further subdivision will be made possible by the study of the heat-labile rickettsial antigen.

The roles of the two rickettsial antigens in typhus immunity are very similar to those played by the Vi and O antigens in immunity to typhoid fever.

Therapeutic anti-typhus sera, as at present prepared, contain only negligible amounts of the O antibody. The use of *Proteus* OX 19 immune serum, in combination with anti-*R. prowazeki* serum, is suggested for the treatment of cases of louse-borne typhus.

The methods of preparing and testing typhus vaccines are discussed.

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CIRCUMCORNEAL INJECTION AS A SIGN OF RIBOFLAVIN DEFICIENCY IN MAN

WITH AN ACCOUNT OF THREE CASES OF ARIBOFLAVINOSIS

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From the heterogeneous collection of signs and symptoms called pellagra a number of specific syndromes are gradually becoming distinct. In 1938-9 Sebrell and Butler first described the specific syndrome of riboflavin deficiency in man, characterized by undue redness of the buccal mucous membrane at the angles of the mouth, by softening of the skin and subsequent fissuring at those angles, and by reddening, fissuring, and desquamation of the vermilion areas of the lips. Similar lesions were observed in the vestibule of the nose and involving the alae nasi and naso-labial folds; and seborrhoeic lesions of the nose, eyelids, and ears were frequent. These findings were confirmed by, among others, Sydenstricker, Geeslin, Templeton, and Weaver (1939), who drew attention to an associated dermatosis which was seen in 2 cases out of 6. A skin lesion, apparently similar, has since been noted by Duckworth (1942). In 1940 Kruse, Sydenstricker, Sebrell, and Cleckley added a further sign—viz., a specific glossitis, different from the red atrophic tongue of the pellagrin in that the organ is purple or magenta in colour, clean, with "flattened or mushroom-shaped" papillae and frequently fissured. They described for the first time ocular lesions characterized by circumcorneal injection, conjunctival congestion, and keratitis. Vascularization of the cornea followed by infiltrations and opacities had previously been described in ariboflavinosis in rats by Bessey and Wolbach (1939). All the above stigmata have been repeatedly resolved by riboflavin but not by any other vitamin, and all except the dermatoses have been produced as the result of experimental feeding.

The ocular manifestations of ariboflavinosis were more fully described by Sydenstricker, Sebrell, Cleckley, and Kruse (1940), who found by means of slit-lamp examination of the cornea that a superficial vascularizing keratitis was the principal ocular manifestation of ariboflavinosis in man. Definite ocular changes could be observed in subjects presenting no evidence of cheilosis or glossitis. Photophobia, blepharospasm, dimness of vision, burning sensations in the eyeballs, "roughness" of the eyelids, and extreme visual fatigue were frequent symptoms, and impairment of visual acuity in the absence of any refractive error or opacity was also described. The earliest and most common ocular sign was found to be circumcorneal injection, which, though "often grossly visible," could always be discerned with the slit-lamp microscope, which revealed actual invasion of the cornea by capillaries in 37 out of 47 cases. Gross injection of the vessels of the fornix and sclera without evidence of infection was also common (43 out of 47 cases). Certain changes in the iris (frank iritis, congestion and pigmentation of the iris) were observed, but much less frequently. Many of these lesions resemble, but are actually distinct from, the ocular manifestations of avitaminosis-A.

Among the series of 47 cases described by Sydenstricker *et al.* (1940) was a group of 18 apparently well-nourished institutional employees, 14 of whom were between the ages of 20 and 35. Only 3 of them were taking "restricted" diets on account of intercurrent disease. All these subjects were considered to have circumcorneal injection, and in addition 13 showed evidence of corneal vascularization when examined with the slit-lamp. On account of this striking finding, but also because of the relative ease with which circumcorneal injection may be detected, it was thought worth while to determine the incidence of this sign in a series of individuals of the hospital class. The results of such an investigation are now presented because of their striking nature, because we believe that the experience of other workers will have been similar, and in order to draw attention to the care which is necessary before circumcorneal injection can be ascribed to ariboflavinosis.

Material and Methods

The investigation was undertaken on a series of 204 cases seen during the routine work of the medical out-patient department of the Edinburgh Royal Infirmary between Oct., 1941, and March, 1942—i.e., during the season when the highest incidence of deficiency disease might be expected to occur. The ages of the patients, none of whom suffered from any ophthalmic infection, varied from 12 to 69. Each subject was

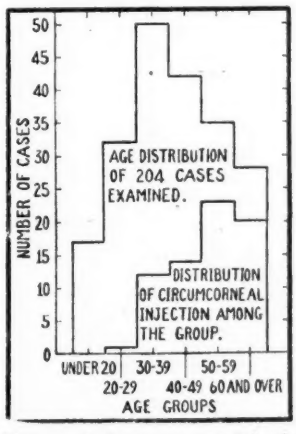

Chart showing incidence of circumcorneal injection, in reference to age, among 204 cases.

examined for circumcorneal injection according to the description given by Sydenstricker and his colleagues, but in no case was the slit-lamp used, and no detailed examination for other stigmata of vitamin deficiency disease was made except in 8 selected cases referred to later. The great majority of the patients suffered from chronic organic disease, but, so far as is

known, none was febrile when examined. Cases of frank vitamin deficiency disorder (2 cases of scurvy, 1 of frank ariboflavinosis, and 1 of pellagra with hypochromic anaemia) are not included in the analysis, but are referred to specifically below.

The riboflavin used in this investigation was "lactoflavin" Roche, supplies of which were made available by Roche Products Ltd. Particular care was taken to ensure that the material was protected from the light, strict instructions on this point being given to all patients.

Results

Out of 204 cases examined, 70 (34.3%) presented evidence of circumcorneal injection. On further analysis the physical sign was seen to be unevenly distributed through the series, occurring with relatively greater frequency in the older patients (see Chart). Among subjects aged 50 or over (63 cases) circumcorneal injection was found in 43 (68%). These striking findings might at first be taken to indicate that one-third of all the patients, and two-thirds of the patients over 50, manifested evidence of ariboflavinosis. This interpretation, even taking into account that the investigation was made during the winter and early spring of the third year of war, seemed to us untenable and to require further consideration of the possibilities involved. Essentially these seem to be (*a*) that we have not interpreted the description of Sydenstricker and his co-workers correctly, or (*b*) that circumcorneal injection cannot always be taken as evidence of ariboflavinosis. It is possible also that we may have erred on both counts. It was accordingly felt that a more detailed examination of a small number of cases would be of value. This was undertaken from two points of view, as follows:

1. On the basis of their willingness to co-operate, 8 subjects were chosen from the above series for more complete investigation, the results of which are briefly set forth in Table I. None of these patients suffered from obvious disease of the alimentary tract, and all were taking a usual diet, apparently adequate for their caloric, protein, vitamin, and iron requirements. They were instructed to make no alterations in their way of living during the period of investigation. With the possible exception of Case 1, there was no obvious difference in the degree of circumcorneal injection during or after oral or parenteral riboflavin therapy. Two cases given brewer's yeast after treatment with riboflavin also failed to improve.

TABLE I.—*Showing Results of Riboflavin Treatment of 8 Subjects with Bilateral Circumcorneal Injection*

Case	Sex and Age	Diagnosis	Other Ocular Symptoms and Signs	Other Stigmata of Possible Deficiency Disease	Riboflavin Therapy	Dosage (mg.)	Result
1	M 53	Chr. bronchitis. Emphysema	"Itchy" eyes	Dry, atrophic, pigmented skin	Oral 6 mg. p.d. for 20 days	120	? Nil. "Eyes feel a little clearer"
2*	F 69	None made	Unequal and irregular pupils. Previous history of iritis	Bruises easily. Undue fatigue	Oral 12 mg. p.d. for 7 days, then I.M. 10 mg. p.d. for 6 days	144	Nil
3	M 48	Lumbar fibrositis	Nil	Nil	I.M. 2 × 10 mg. on first day, then oral 6 mg. p.d. for 14 days	104	Nil
4†	F 54	Colloid goitre. Auricular fibrillation	Eyes easily fatigued	Nil	Oral 6 mg. p.d. for 27 days	162	Nil
5	F 46	Obesity and glycosuria	? Allergic conjunctivitis in spring	Nil	Oral 3 mg. p.d. for 10 days, then 6 mg. p.d. for 10 days, then 12 mg. p.d. for 6 days	162	Nil
6	M 40	Chr. (left) pyelonephritis. Under urological investi ation	Nil	Nil	Oral 6 mg. p.d. for 14 days; 4 I.M. injections 10 mg.	124	Nil
7	M 42	Pleurisy. Unresolved pneumonia	Nil	General debility	Oral 6 mg. p.d. for 14 days, then brewer's yeast 2 oz. p.d. for 14 days	84+	Nil
8	M 50	Chr. bronchitis. Emphysema	Rapidly progressive presbyopia. Marked arcus senilis	Nil	Oral 6 mg. p.d. for 14 days, then brewer's yeast 2 oz. p.d. for 10 days	84+	Nil

* Gave a previous history of aphthous stomatitis four years ago.
† This patient was taking digitalis during the latter part of the investigation.
The riboflavin content of brewer's yeast is given by Fixsen and Roscoe as 1·5 mg. per 100 g.

TABLE II.—*Effect of Riboflavin Therapy in 8 Cases of Frank Vitamin Deficiency with Circumcorneal Injection*

Case	Sex and Age	Diagnosis	Other Signs and Symptoms of B-complex Deficiency	Riboflavin Therapy	When Given	Dosage (mg.)	Result
9	M 71	Scurvy	Peripheral neuritis. Sore tongue. Dry scaly skin*	Oral 6 mg. p.d. for 22 days + 2 I.M. injections of 10 mg. each	After ascorbic acid 5·9 g. and thiamin 0·35 g.	150+	? Nil
10	M 61	Scurvy	Nil	Oral 6 mg. p.d. for 28 days, with brewer's yeast 20 g. p.d. for 14 days	With ascorbic acid 500 mg. p.d. for 7 days	162+	Nil
11	M 58	Scurvy	Peripheral neuritis. Aphthous stomatitis. Dry scaly skin. Cured by brewer's yeast	Oral 6 mg. p.d. for 14 days	After ascorbic acid 3·5 g. and hesperidin 9 6 g.	84	Improved
12	M 60	Scurvy	Paraesthesiae; numbness in both feet later ? cured by thiamin	Oral 6 mg. p.d. for 14 days + I.M. injection of 10 mg.	After ascorbic acid 3·6 g. hesperidin 48 g.	94	Improved
13	F 48	Hypochromic microcytic anaemia	Bright-red painful tongue. Buccal ulceration. Rough pigmented skin elbows and wrists†	I.M. 5 mg. p.d. for 10 days	With $FeSO_4$ 9 g. p.d. and ascorbic acid 200 mg. p.d.	50	Cured
14	M 40	Scurvy	Marked peripheral neuritis and oedema responding to thiamin. Stomatitis. Sore tongue	I.M. 5 mg. and 10 mg. on alternate days	After ascorbic acid 5·5 g. and thiamin 0·35 g.	50	Cured
15	M 60	Scurvy	Nil	I.M. 5 mg. p.d. for 7 days, then brewer's yeast 2 oz. p.d. for 26 days	After ascorbic acid 6 g.	35+	Nil
16	M 40	Pellagra	Diarrhoea. Stomatitis. Red, raw, atrophic tongue. Thick dry pigmented skin †	I.M. 10 mg. p.d. for 5 days, then 12 mg. p.d. orally for 14 days	After ascorbic acid 5 g. and nicotinic acid 4·2 g.	218	Cured

* Circumcorneal injection very marked. No evidence of infection. Photophobia and blepharospasm, "roughness" of the eyes and undue visual fatigue all improved by riboflavin. Other signs and symptoms resolved by brewer's yeast or nicotinic acid.
† All cured by nicotinic acid.

It is clear, therefore, that a form of circumcorneal injection exists which is not cured by riboflavin even in large doses. In 8 cases this was not found to be associated with other evidence of riboflavin deficiency or with other stigmata of deficiency disease. It cannot, therefore, be ascribed to ariboflavinosis. It may be observed in this connexion that Youmans (1941) has evidently observed a number of cases of angular stomatitis (cheilosis), indistinguishable from those due to riboflavin deficiency, which failed to respond to oral or parenteral riboflavin therapy. He considered that these cases were unlikely to be due to riboflavin deficiency.

2. A second group of 8 subjects, all of whom presented evidence of frank vitamin deficiency disease, were studied in order to determine (*a*) whether circumcorneal injection similar in appearance to that already noted could be detected, and (*b*) whether riboflavin could resolve the abnormality. Table II summarizes the results of this investigation. Circumcorneal injection could be detected in all these cases; we have, however, records of subjects suffering from frank vitamin deficiency disease, especially scurvy, who do not show this clinical sign. Six of the 8 cases presented in addition other evidence of deficiency of the B-complex vitamins: of these, 3 were cured and 2 definitely improved in respect of circumcorneal injection by riboflavin therapy, the other manifestations of B-complex deficiency afterwards yielding to thiamin, nicotinic acid, or brewer's yeast. One case with marked circumcorneal injection showed no improvement from riboflavin or brewer's yeast, although other stigmata of B-complex deficiency were resolved and there was considerable, and almost certainly genuine, symptomatic relief (see footnote to Table II). Two cases of scurvy without evidence of B-complex deficiency had circumcorneal injection but did not respond to riboflavin therapy or to brewer's yeast.

It is clear, from the study of these cases, (*a*) that circumcorneal injection, even when associated with frank vitamin deficiency disease, cannot always be resolved by riboflavin, and is therefore not necessarily a stigma of ariboflavinosis; and (*b*) that a form of circumcorneal injection exists which is resolved by riboflavin but which has been, in our experience, invariably associated with other stigmata of B-complex deficiency. This latter finding confirms in part the observations of Sydenstricker and his colleagues, but seems to point to the fact that circumcorneal injection (as interpreted by us) is not in itself evidence of ariboflavinosis. The physical sign requires to be supported by other evidence of deficiency of the B-complex vitamins, or possibly by examination of the cornea by slit-lamp microscopy—a procedure of which we have no experience.

Further confirmation of these findings and of the classical description of clinical ariboflavinosis by Sydenstricker *et al.* is provided by the following 3 cases of the fully developed deficiency syndrome.

Illustrative Cases

Case 17.—This patient, a woman aged 53, had complained of the symptoms of flatulent hyperchlorhydric dyspepsia with considerable epigastric pain for some three months, together with recent loss of weight and constipation. On investigation she was found to have a small, probably benign, ulcer on the lesser curvature of the stomach. She had been dieting herself for many years. When examined she had photophobia, " roughness " of the eyes, " itchiness " of the lids, and undue visual fatigue for which she had recently been bathing her eyes each evening. Mild blepharospasm, marked reddening of the ciliary margin, and circumcorneal injection were also present. She had aphthous stomatitis and a painful fissure at the right-hand angle of the lips. Her tongue, which was often sore, was pale, smooth, and atrophic. She had recently become a little breathless on exertion, and had a resting pulse rate of 100 a minute and a blood pressure of 110/68 with no evidence of cardiovascular disease. Recently lassitude, depression, and undue fatigue, with pains across the shoulders and down the right arm, had been additional features of the case. This patient's ocular signs and symptoms were rapidly resolved by riboflavin in doses of 12 mg. daily by mouth. Thereafter, regulation of the diet, with the administration of brewer's yeast in doses of 1/2 oz. four times a day, produced remarkable clinical improvement. Pain disappeared within 2 to 3 weeks. She had much more energy and was able to climb stairs without dyspnoea. The resting pulse rate fell to 70–80, and the blood pressure increased to 128/80. The aphthous stomatitis was much improved but not cured. Four weeks after stopping brewer's yeast, and while she was still taking what appeared by normal standards to be an adequate diet, she developed circumcorneal injection, " roughness " of the eyes, and mild photophobia. These again responded to riboflavin treatment.

Case 18.—A woman aged 56, with steatorrhoea following multiple abdominal operations. She had had cheilosis intermittently for two years. On examination there was marked and multiple fissuring at both angles of the mouth, in the naso-labial folds, and at the lateral canthus of both eyes. She had a very painful aphthous stomatitis with dysphagia and a smooth, pale, tender tongue. Circumcorneal injection was present together with " roughness " of the eyes and impaired visual acuity. Oral administration of riboflavin, 6 mg. daily for 6 days, produced considerable improvement, and daily intramuscular injection of 5 mg. for 10 days completely cured the cheilosis, circumcorneal injection, and ocular symptoms. The aphthous stomatitis, and especially the sore tongue, were not resolved by riboflavin, but responded to nicotinic acid in daily doses of 200 mg. by mouth. All the symptoms returned within 14 days after discontinuing the therapy, even although the diet, by normal standards, was more than adequate in respect of vitamins of the B complex.

Case 19.—This patient, a man aged 69, had been treated intermittently for " pernicious anaemia " since 1916, and for the last 10 weeks had been having injections of liver extract (pernaemon) every 14 days. At the beginning of the present investigation the Hb was 12.2 g. per 100 c.cm. (88% Haldane), with R.B.C. 4,000,000 and C.I. 1.10. He had been complaining for some six months of debility, lassitude, undue fatigue, and vague pains across the shoulders, down the arms, and in the back of the neck. For several years, especially in the winter and early spring, he had had a scaly non-erythematous skin lesion on the calves of the legs, forearms, and back of the hands that was always intensely itchy. On examination a dry " branny " skin was found, with perifollicular keratitis in both upper arms, patchy pigmentation on the back of both hands, forehead, and face, and deformed, ribbed, and very brittle finger-nails. Circumcorneal injection was present, associated with " roughness " of the eyes, some photophobia, and a previous history of iritis, of which residual evidence remained. There was marked cheilosis at the angles of the mouth but none elsewhere. The appearance of the tongue was very striking, the organ being large, somewhat painful and tender, irregularly fissured with large flattened papillae, and magenta in colour. The characteristic purple hue of the tongue in ariboflavinosis can be appreciated best if the organ is inspected within the mouth, where its colour can be viewed against the background of the palate. The tongue of the typical pellagrin appears relatively small and rough, and is redder than the palatal mucous membrane. The tongue in ariboflavinosis appears relatively large and smooth. It is, however, deeply fissured and strikingly more purple than the mucous membrane of the palate and cheek.

After several examinations at weekly intervals, during which no significant alteration in the clinical picture occurred, riboflavin 6 mg. daily by mouth was given. After 30 mg. considerable clinical improvement was noted in respect of the ocular changes, cheilosis, glossitis, and dermatosis. In particular, circumcorneal injection was completely resolved. This improvement occurred in spite of the fact that the patient had been receiving every 14 days an injection of liver extract which probably contains some riboflavin. Further treatment by 2 oz. of brewer's yeast daily maintained the clinical improvement, and appeared, after two weeks' administration, to have had a favourable effect on the dermatosis. The perifollicular keratitis was not, however, improved. The patient was seen again 26 days after all therapy had been discontinued. His general health had improved considerably, but cheilosis, glossitis, and circumcorneal injection were again present.

Discussion

A striking feature of the clinical course of the above three cases has been the relatively rapid return, within 2 to 4 weeks after treatment had been stopped, of symptoms and signs (viz., cheilosis, glossitis, circumcorneal injection, and ocular symptoms) which are evidently to be ascribed to riboflavin deficiency, since they are identical with those described by Sebrell and Butler and by Sydenstricker and his colleagues, and which, furthermore, have responded (in one case on two occasions) to treatment with riboflavin. In 18 out of the 47 cases referred to by Sydenstricker *et al.* (1940) relapse occurred shortly after riboflavin therapy had been discontinued. Apart from 15 apparently healthy individuals whose diets could not be regarded as deficient or unusual, the majority of their cases were taking a frankly deficient diet. Analysis of the diets taken by Cases 17, 18, and 19 of the present series reveals that Cases 17 and 18 were certainly receiving between 2 and 4 mg. of riboflavin a day—on at least 3 days a week in Case 17 and daily in Case 18. Case 19 took a diet which

could not be criticized on any ground, and in addition received 2 c.cm. of liver extract every other week.

A possible interpretation of these findings is that the riboflavin requirements of certain individuals are unusually great, as the result either of abnormal utilization or of defective absorption, or both. The idea that synergistic reactions in respect of other vitamins condition the absorption and utilization of riboflavin must be taken into account in evaluating this possibility. Although the results of the present investigation may be taken to indicate the existence of at least two types of circumcorneal injection, only one of which is resolved by riboflavin therapy, an alternative interpretation would appear to be that the development of circumcorneal injection is conditioned by a number of limiting factors, only one of which is a relative deficiency of riboflavin in the diet. In the latter connexion it is of interest to recall the findings of Albanese and Buschke (1942), who observed the clinical manifestations of ariboflavinosis in rats occurring as the result of a lack of tryptophane in their diet. A relationship between the metabolism of protein and another vitamin of the B complex is indicated by the work of Banerji (1941), who found that the presence of a large amount of protein in the diet of rats prevented the bradycardia and loss of weight usually associated with thiamin deficiency, and also that the growth rates of rats on various graded levels of vitamin B_1 were better in each case with excess of protein than without it.

Summary and Conclusions

In a series of 204 unselected out-patients between the ages of 12 and 69 circumcorneal injection was observed in 70 cases (34.3%). In 63 of those aged 50 or over circumcorneal injection was found in 43 (68%).

The observations of Sydenstricker *et al.* on the occurrence of circumcorneal injection in ariboflavinosis have been confirmed, but a form of the condition exists even in subjects presenting evidence of frank vitamin deficiency disease which cannot be attributed to a deficiency of riboflavin, as it is not resolved by administration of the vitamin. The latter finding no doubt accounts for the relatively high incidence of circumcorneal injection observed.

Although circumcorneal injection may be an early stigma of ariboflavinosis it cannot be considered such unless supported by other clinical findings—cheilosis, glossitis, dermatosis, and ocular symptoms—or by slit-lamp examination of the cornea (Sydenstricker *et al.*). The result of a therapeutic test, however, probably still remains the best criterion.

Three cases of ariboflavinosis are described, and it is suggested that certain subjects manifest a requirement for riboflavin which, for reasons unknown, is unusually large.

ADDENDUM.—Since completing this paper we have had the opportunity of discussing the matter with Dr. Sydenstricker, who has seen with us several cases of ariboflavinosis confirmed by slit-lamp microscopy. It is evident that the circumcorneal injection which forms the basis of this communication differs in no material way, on purely clinical examination, from that described by Sydenstricker in frank ariboflavinosis.

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DOCTORS FROM OVER-SEAS: HOSPITALITY AT L.C.C. HOSPITALS

The London County Council is offering hospitality at its hospitals to Service doctors and nurses from the U.S.A., Canada, Australia, New Zealand, South Africa, etc. Details of the arrangements have been sent to the various authorities concerned. There may be, however, doctors and nurses who will not hear about it through official channels, and also there may be some from the countries mentioned who are serving with the British Forces. Any such who would like to visit L.C.C. hospitals or stay there during short leave should get into touch with the Medical Officer of Health, London County Council, County Hall, S.E.1 (telephone WATerloo 5000, extension 6425).

SULPHONAMIDES USED LOCALLY

THEIR ABSORPTION FROM SEROUS CAVITIES AND WOUNDS IN MAN

BY

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The sulphonamides are the most satisfactory of the drugs at present available for use in preventing the development of infection in contaminated wounds. There is evidence to show that they are more effective when used locally in the wound than when they are given by mouth or parenterally, owing to the greater concentration at the site of potential infection. The local effects of these compounds depend on their individual bacteriostatic powers and their physical properties. To be of benefit the selected drug or mixture of drugs should be present in the wound fluids in sufficient concentration and for long enough for the infection to be wiped out or for the normal tissue reactions to obtain control of the situation. The rate of absorption of sulphonamides from wounds is therefore of importance, and the present study was undertaken to investigate this problem. As the work was interrupted by the change of appointment of one of the authors the results presented are unfortunately incomplete.

Methods.—Observations were made on patients undergoing operations, many of which were abdominal. Before the peritoneum was closed the sulphonamide was introduced in measured quantities. Powders were sprinkled or dumped into the cavity out of a small container and spread with the finger. Solutions and suspensions were inserted through a catheter, around which the peritoneum had been almost closed; in this way little or none of the drug was lost. The subsequent absorption was followed by taking blood samples at 6, 24, and 48 hours and by measuring the excretion in the urine.

Results

The results in 25 cases are shown in the accompanying table. These include 8 cases observed by Prof. R. S. Pilcher. Nearly 60 other cases were observed clinically, but they have been omitted from this table as the records are incomplete in some particular or other. The first group consists of 11 patients who received 5 g. of sulphanilamide powder. This group comprised 6 abdominal operations, 3 thoracoplasties (2 on children), 1 nephrectomy, and 1 wound of the forearm. The blood and urine figures varied somewhat irregularly, without particular reference to the nature of the operation; for conciseness they are given as an average. Three other cases received 7.5 to 10 g. and a fourth case 15 g., and the concentrations in the blood and urine were somewhat higher. It is seen that when 5 to 10 g. of sulphanilamide is placed in the peritoneal cavity most of the urinary excretion occurs during the first two days. An effective blood concentration was maintained for 24 hours, the maximum reading (at 6 hours) corresponding in this series to about 0.5 to 1 mg. per 100 c.cm. for each gramme of sulphanilamide inserted.

Three patients received 5 to 7.5 g. of "hypoloid sulphanilamide L.S.F." intraperitoneally. This is a Burroughs Wellcome preparation consisting of 15% sulphanilamide in solution as sulphanilamide lactoside sodium formaldehyde sulphoxylate, and it is intended for intramuscular injection. As seen from the table, most of the urinary excretion occurs during the first twelve hours, and probably bacteriostatic activity in the peritoneum is too brief for the optimum results to be obtained.

In 2 cases a wound was packed with gauze and an oil-in-water emulsion, Preparation C, made by the British Drug Houses Ltd. (sulphanilamide 30, beeswax 0.7, cod-liver oil 49, oleic acid 3.6, sodium hydroxide 0.5, water to 100 parts—Fuller, Hawking, and Partridge, 1942). In animals it has been

found that the presence of the oil delays absorption, provided that the surface is small compared with the volume, as in the present instance. In these two cases the results are rather irregular, but after 5 to 6 days the dressing still contained considerable quantities of sulphanilamide. In a third case a small deep wound was packed with gauze plus a preparation consisting of sulphanilamide 30%, cod-liver oil 60%, and beeswax 10%, about 4 g. of sulphanilamide being inserted; the blood concentration at 24 hours was free 1.1, total 1.7 mg. per 100 c.cm., and during the next 5 days the daily excretion of sulphanilamide in the urine was about 0.2 to 0.4 g.; when the dressing was removed on the fifth day it contained about 0.2 g. of the compound. It should be noted that further histological study of experimental wounds has led us to the conclusion that all types of oil which may become embedded in a wound lead to undesirable tissue reactions and that cod-liver oil is particularly deleterious in this respect (Hawking, 1942).

Six patients received sulphadiazine inserted as a microcrystalline suspension (Chambers *et al.*, 1942), and the results with 4 of them are shown in the table. The blood concentrations in these cases were high, but the urinary excretion was less prolonged than animal experiments had led us to expect. The effect of this treatment on the clinical condition seemed to be good, allowing for the grave nature of these cases. Two

pyridine administered prophylactically by mouth from the time of operation onwards. As regards abdominal operations, the cases recorded in the table showed uniformly satisfactory results so far as concerned the prevention of local infection, in spite of the fact that in many instances the peritoneum was heavily soiled. In one case a peptic ulcer re-perforated 4 days after the original operation for closure of the opening, and a second closure combined with gastro-enterostomy had to be done, yet no peritonitis developed. In other cases existing infection was suppressed. An appendix abscess was evacuated and packed with about 15 g. of sulphanilamide powder; a corrugated rubber drain was inserted and removed 24 hours later; the wound then healed by first intention. Ten weeks later the appendix was removed. No trace of the powder remained, the only sign of the abscess being a few light adhesions.

(B) *General Toxic Effects.*—The quantity of drug inserted rarely exceeded 10 g., and no general toxic effects of any significance were observed. The method is considered perfectly safe. If systemic administration was combined with local insertion, due allowance was made for the amount which had been inserted.

(C) *Local Effects other than Counteracting Infection.*—In muscle and fascial layers the sulphonamides appear to delay healing by their chemical effects on cell-proliferation and by

Table showing Amount of Various Sulphonamide Compounds in Urine and Blood following Insertion into Abdominal or Other Wounds

Preparation and Dose	Daily Excretion in Urine (g.)					Total Excretion (g.)	Concentration in Blood, free/total (mg. per 100 c.cm.)			Remarks
	1st	2nd	3rd	4th	5th		6 hrs.	24 hrs.	48 hrs.	
Sulphanilamide:										
5 g.	1·08	1·10	0·35	0·21	0·02	2·5	3·2/4·2	2·7/3·8	1·0/1·5	Av. of 11 miscellaneous cases
7·5–10 g.	2·0	2·7	0·85	0·48	—	6·0	6·3/8·1	4·2/6·4	1·2/2·2	Av. of 3 cases (thoracoplasty, thoracotomy, gastrectomy)
15 g.	anuria	0·76	0·90	0·76	0·26+	2·7+	—	12/13	2·3/3·8	Excision of loop of colon
Sulphanilamide L.S.F. (½ 1 1½ 2 3 days) 5–7·5 g.	2·0	0·8	0·4	0·6	0	3·3	1·5/1·9	0·5/1·0	—	Av. of 3 cases (perforated D.U. (2), appendice tomy)
Preparation C:							(12 hrs.)			
9 g. sulph.	1·0	0·84	0·04	0·09	0	2·0	2·4/3·7	1·4/2·4	0/0·7	Wound of thigh. After 6 days 1·5 g. sulph. remained
30 g. sulph.	1·48	0·31	—	—	—	1·8+	2·3/3·1	8·1/9·5	2·3/2·9	Excision of rectum. After 5 days 19 g. sulph. remained
Sulphadiazine:										
3·7 g.	0·09	3·1	0·38	0·12	0·27	3·9	10/10·5	8·1/9·7	2·3/2·3	Perforated D.U. No drug excreted during 6th to 10th days
3·4 g.	—	1·5	0·72	0·24	—	2·4	7·5/9·0	2·4/3·3	1·4/1·3	Perforated D.U. 72 hours
4·0 g.	anuria	0·96	0·87	—	—	—	—	7·2/18	5·0/5·8	Perforated D.U. Died 8th day. Blood conc. at 72 hours, 2·6/3·8 mg.
4·8 g.	2·8+	0·71	0·30	0·07	0·07	4·0+	—	2·9/4·2	2·2/2·6	Pelvic peritonitis. Blood conc. at 72 hours, 0·6/0·7 mg.
Sulphathiazole:								(18 hrs.)		
5 g.	0·44	0·68	0·36	0·08	0·02	1·7	—	1·9/3·0	—	Nephrectomy with drainage, 0·5 g. escaped on to dressing
5 g.	anuria	2·6	trace	trace	—	2·6	(12 hrs.) 1·0/1·0	0/0	0/0	Resection, carcinoma of colon. Drained

of the patients died, on the eighth and tenth days respectively, and small cakes of solid sulphadiazine were found in the recto-vesical fossa, surrounded by adhesions and lymph; histologically, there was little evidence of irritation specifically due to these lumps. It is concluded that the absorption of sulphadiazine is incomplete and that it is not the best compound for intraperitoneal use. Further investigations were planned but could not be carried out.

Clinical Conclusions

In only a few cases was it possible to estimate the absorption and excretion of sulphonamides with accuracy, but clinical conclusions have been based on a series of more than 60 cases, many of which were air-raid casualties.

(A) *Local compared with General Administration.*—Local administration was found beneficial in every case. In 20 severe cases of lacerated wounds, including many multiple dirty bomb wounds, no case of gas gangrene or spreading wound infection developed. On the other hand, a clean through-and-through bomb wound of the leg, not involving bone, developed a virulent gas-gangrene infection two days after operation in spite of radical surgical excision, with drainage, and full doses of sulpha-

their presence as foreign material. Their use should be reserved for contaminated or potentially contaminated wounds. Serous cavities showed no surface reactions of an inflammatory nature. As noted above, caked sulphadiazine was walled off by adhesions and a deposit of lymph, and it is considered that it was too insoluble to be entirely suitable. By packing sulphanilamide at one end of a nephrectomy wound and placing a tubular cigarette drain at the other, it was shown that the drug diffused throughout both the wound and the drain within 48 hours. This observation indicates that although most careful distribution over the whole wound is desirable, sulphanilamide will spread beyond the exact area into which it has been introduced.

Discussion

Many papers dealing with the intraperitoneal application of sulphonamides have now been published, the majority by American authors. Besides the workers mentioned in a recent review (*Lancet*, 1942, **1**, 235), experiments with animals have been described by Schmidt *et al.* (1941); Stevens, Taliaferro, and Haag (1941); Rosenburg and Wall (1941); Epps, Ley, and Howard (1942); Harvey, Meleney, and Rennie (1942); and Pearl and Rickles (1942). Some of these authors described

results in human patients. Clinical observations have also been described by Burford and Graham (1941), Kinney (1941), Anderson (1942), and Hudson and Smith (1942). Ryan, Bauman, and Mulholland (1942) inserted sulphadiazine intraperitoneally during 6 operations, with satisfactory results.

Harild (1942), working with the Finnish Army, reports the intraperitoneal insertion of sulphathiazole into 8 cases of abdominal wounds, and recommends further trial. A detailed discussion during a meeting of American surgeons is given by Mueller and Thompson (1942), and Jackson and Coller (1942). General opinion is in favour of using sulphanilamide in doses of 5 to 10 g. per patient, in cases in which the peritoneum has been contaminated by bacteria; the suitability of sulphathiazole for this purpose is still under consideration. Several writers have stated that the insertion of sulphanilamide into clean wounds of the abdominal wall may cause sero-sanguineous effusions and therefore its application at this site should be restricted to infected cases. The researches described in the present paper were designed to compare the suitability of the various sulphonamide compounds for this purpose and to amplify results obtained in animal experiments (Fuller, Hawking, and Partridge, 1942). Although they are incomplete they support the use of these compounds in cases in which contamination of the peritoneal cavity has occurred. Sulphadiazine appears to be too slowly absorbed, and "hypoloid sulphanilamide L.S.F." to be too rapidly absorbed, for the optimal results to be obtained. A mixture of sulphanilamide and sulphathiazole might be the most satisfactory preparation.

Before leaving the subject, however, it is necessary to draw attention to the need for sterilizing compounds before their insertion into wounds: this has been emphasized by the recent case of tetanus which followed the intra-abdominal insertion of sulphapyridine during an abdominal operation (*Journal*, 1942, **2**, 134).

Summary

Sulphonamide compounds were placed in all types of wounds, including the peritoneal cavities of patients undergoing certain abdominal operations. The absorption was studied by estimating the subsequent concentrations in the blood and urine. The effects of this treatment seemed beneficial.

When sulphanilamide powder (5 to 10 g.) was inserted most of the absorption and excretion occurred in the first two days. When "hypoloid sulphanilamide L.S.F." (5 to 7.5 g.) was inserted most of the excretion occurred in the first 12 hours; when microcrystalline sulphadiazine was inserted some of it was still present in the peritoneal cavity 8 to 10 days later. It is considered that the absorption of "hypoloid sulphanilamide L.S.F." from the peritoneal cavity is too rapid, and that of sulphadiazine too slow, for the optimal therapeutic effect to be obtained.

We express our thanks to Prof. R. S. Pilcher for allowing us to make use of his 8 cases; and to many members of the junior surgical staff and of the nursing staff of St. Bartholomew's Hospital for their assistance at the operations and in the collection of the specimens of blood and urine.

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A red pigment described as actinomycin A has been isolated in a pure crystalline organism, *Actinomyces antibioticus* (S. A. Waksman and M. Tishler, *J. biol. Chem.*, 1942, **142**, 519). Actinomycin is actively bacteriostatic and bactericidal in concentrations of 1 in 1,000,000 against certain Gram-positive bacteria. It is highly toxic to animals.

SPONTANEOUS ANNULAR DETACHMENT OF THE CERVIX DURING LABOUR

BY

M. DAVIES WESTERMAN, M.R.C.S.

This accident appears to be a rare complication of labour. DeCosta (1933) reported that there were only 32 recorded cases between 1820 and 1933, and the spontaneous nature of some of these was debatable. The following case can, however, be definitely included under the title given above. The last case published in the *Journal* was by Burt-White (1938).

Case History

The patient, a primipara aged 27, was a short, fat, flabby Jewess of excitable temperament who had attended the antenatal clinic regularly. She was always "full of woe," with multiple complaints but no abnormal physical signs, apart from oral sepsis. On routine vaginal examination (July 8, 1941) she was found to have a flat type of pelvis. The sacral promontory was felt. The foetal head remained high as she approached term, and she was booked for a trial labour in Shardeloes Emergency Maternity Hospital, Amersham. The expected date of delivery was Feb. 10, 1942.

First Stage of Labour.—The patient was admitted to hospital on Feb. 25, complaining of generalized abdominal pains and diarrhœa for 24 hours; there were no signs of labour having started. The head was two-thirds above the brim and freely movable; presentation V.R.O.P. The blood pressure was 150/100. At 10.15 p.m. on Feb. 26 her membranes ruptured, and she began having short pains every 5 to 10 minutes. After 10 hours the head was in the pelvis, and on vaginal examination the cervix was two-fingers dilated. The first stage continued normally, apart from difficulties arising out of her very uncooperative behaviour, until the evening of Feb. 27, when the pulse rate began to rise gradually from 88 to 110. Morphine 1/4 grain was given, and despite a good night the pulse had risen to 130 by the morning of the 28th. This rate was maintained till after delivery. The rhythm was always regular and the volume good, except for a short period (3 to 8 minutes) during the afternoon of the 28th, when it became irregular and thready. No cause for this rise could be found. Her general condition was good, and she was more co-operative. She was having fair pains every 5 to 10 minutes. There was no bleeding, the head was deeply engaged, and the uterus was relaxing well. The following treatment was given during the first stage:

Feb. 26: Routine ol. ric.; bath; enema.
Feb. 27: 2.45 a.m., morphine gr. 1/4; 2 p.m., syrup. chloral gr. 30, pot. brom. gr. 30, tinct. opii m. 20; 11 p.m., catheterized. morphine gr. 1/4.
Feb. 28: 2 p.m., enema, pot. brom. and chloral gr. 30 āā.

Second Stage.—At 5.30 p.m. on Feb. 28 the patient began to "bear down," and the head appeared at the vulva. She was transferred to the labour ward, having poor pains at 15-minute intervals. The head did not appear again until 6.30 p.m., and showed no advance by 7.30 p.m. The general condition was good; the pulse rate was still 130 and of good volume. The foetal heart rate was 132. It was decided to terminate with forceps. She was anaesthetized with gas-and-oxygen and ether. The head was found well down, arrested in the transverse diameter. There was a small caput. The head was rotated: during this manœuvre a loose band of oedematous tissue was felt between the head and the sacrum. On further investigation this proved to be the prolapsed anterior cervical lip; the cervix having sloughed round the anterior two-thirds of its circumference, the head was presenting through the "rent." There were multiple loops of cord round the child's neck, which were pulsating slowly. As the "vital" part of the cervix had already separated, only the posterior third being left attached, it was considered that the danger of haemorrhage from the uterine arteries, and tearing into the vaginal vaults, was now over. Forceps were therefore applied to the head, through the rent, above the ring of detached cervix. The 8-lb. baby was easily delivered, but unfortunately it was stillborn. The cervix was delivered in front of the head, the posterior third evidently tearing off when traction was applied to the head.

Third Stage.—The placenta was expressed in 10 minutes. At no time during labour or delivery was there any abnormal or excessive bleeding. A careful examination was made both by hand and with the speculum, and a small tear in the left vaginal vault was sutured with No. 3 catgut. After delivery the patient was suffering from shock; her pulse was thready—rate 140—but the blood pressure was 110/80. She responded well to ordinary restorative measures.

The puerperium was uneventful. She got up on the twelfth day and went home 2 days later.

Post-natal Vaginal Examination.—The smooth regular cervical stump was palpated. It felt very like a normal short post-natal cervix. A speculum examination was not performed, as the patient would not co-operate. To all appearances the pain of this examination was as great as that experienced at any time during labour. The detached portion of the cervix was sent to the museum of the Royal College of Obstetricians and Gynaecologists. It was shaped like a quoit or a pineapple ring 3½ to 4 inches in diameter, with the centrally placed external os about two-fingers dilated. The anterior two-thirds was purple and oedematous, the posterior third pink and thin.

Commentary

Looking back on the case it is considered that the rising pulse rate was caused by the "shock" attendant on the detachment of the cervix, but it is surprising that the pulse volume and general condition of the patient were consistently so good. Had the nature of the condition been recognized earlier, would interference have been indicated or justifiable? It is probable that a live baby would so have been obtained; though an explanation for the stillbirth has not been found. As for the mother, it is hoped that, after the good termination, she will become pregnant again and have a normal labour, as was the end-result of the case reported by Epstein (1941). I should add that the maternal and foetal mortality rates in recorded cases of this complication are very high.

I wish to thank Dr. G. W. H. Townsend, medical officer of health for Buckinghamshire, and Miss Beatrice Turner, obstetrician in charge of Shardeloes Emergency Maternity Hospital, for permission to publish this case.

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Medical Memoranda

Riboflavin Deficiency: With a Case Report

Thiamin, nicotinic acid, and riboflavin are the three main factors in the vitamin B complex. They are necessary for the formation of coenzymes concerned in carbohydrate metabolism and are closely related. A deficiency in any one affects the function of the other two. Riboflavin forms a phosphoric acid ester which combines with protein to produce the yellow oxidation enzyme of Warburg and Christian, an essential part of one of the oxidation-reduction systems of the body, associated with respiration and other basic cell functions. The most readily available sources are liver, muscle meats, cheese, yeast, and most green vegetables. The physiology of the absorption, storage, and excretion of riboflavin is not clearly known. The optimum daily requirement for adults is estimated at 1 to 2 mg.

Ill-health caused by lack of a single food factor is uncommon. One syndrome may predominate, but search generally reveals other deficiencies. It is especially noticeable in hypovitaminosis of the B group, many cases of pellagra presenting signs of ariboflavinosis. Sebrell and Butler (1938) showed that certain characteristic lesions, thought to be part of the pellagra symptom-complex, were due to riboflavin deficiency. Sydenstricker (1941) suggests that beriberi, pellagra, and endemic ariboflavinosis are major syndromes of B group avitaminosis resulting from prolonged subtotal deficiency of the whole B complex.

The syndrome of riboflavin deficiency (Sebrell and Butler) consists of angular stomatitis, tongue changes, corneal vascularization and other eye changes, seborrhoeic dermatitis, and general debility. Few instances of the condition have been described, and of these some lack definition.

Case Report

A farmer's widow aged 75 had been in "poor health" for eight or nine years. Two years ago she came under my care, complaining of digestive disturbances, weakness, "neuritis" pains, failing sight, and inflamed eyes. She was emaciated and had many small punctate haemorrhages under the skin of the arms and legs. The heart was weak and fast, and the blood pressure 110/60. There was some anaemia (Hb 9 g.). The eyes showed marked chronic inflammation of conjunctiva and margins of lids, with constant copious purulent exudation. There were early cataracts in both lenses and marked photophobia. Conjunctival vessels in the palpebral aperture were dilated. Deep, raw, and slightly painful fissures persisted for years, and extended from the corners of the mouth for about an inch. Her tongue was swollen, sore, and fissured. Patellar and ankle reflexes were diminished. She was treated with improved diet, large quantities of thiamin, halibut-liver oil, and vitamin C (redoxon). She improved considerably, but the eyes, the angular stomatitis, and the sore mouth were not helped. In the spring of 1941 she relapsed and had severe continuous diarrhoea, associated with dermatitis of the legs and again a sore tongue. Nicotinic acid cleared up the diarrhoea and dermatitis but not the tongue. Eye symptoms were not improved. Her case was described in a paper on pellagra (Deeny, 1942). This spring she became weak and debilitated and lost weight. Her eyes were still affected as described above, and a few tiny leashes of capillaries had invaded the subepithelial region of the cornea. Photophobia was especially marked. The tongue was pale, flabby, clean, moist, burning, and sore, with several deep fissures and enlarged and flattened papillae. Two deep fissures ran from the corners of the mouth, both over an inch in length, with granulating surfaces. The nose and the neighbouring cheek surfaces showed follicular hyperkeratosis, giving a swollen "doughy" appearance. The lips were redder than normal and the line of junction of the mucous membrane and skin was irregular. Nicotinic acid was given without result, and later a 2-mg. injection of riboflavin (B. W. & Co.) three times a week for three weeks, followed by 4 mg. of riboflavin daily in 1-mg. tablets (Roche). In four weeks the angular stomatitis was healed, the eyes were no longer inflamed, the photophobia had gone, and the general health was improved. Her sight remained unchanged. Dr. V. P. Sydenstricker, who saw the case later, suggested large doses of riboflavin (12 mg. daily for two weeks) in the hope that the cataract might improve, but without result.

Comment

A feature of interest is that, while the patient suffered from a multiple deficiency, the syndrome of ariboflavinosis was present from the beginning, was unaffected by any treatment, and cleared up only when riboflavin was given. In some cases I have seen bluish patches on the tongue, usually near the margin, contrasting with the colour of the surrounding tissues, disappear with riboflavin treatment. In Northern Ireland riboflavin deficiency is fairly prevalent among elderly persons living on a poor diet. When it occurs in young persons it does not seem to be related so closely to diet, but more to lack of sleep or overwork, or as a complication of illness. I have found "poor" general health an important feature of the syndrome.

I wish to thank the Medical Research Council of Ireland; Dr. Sydenstricker; and Burroughs Wellcome and Co. and Roche Products, Ltd., for their generous gifts of riboflavin.

Lurgan. JAMES DEENY, M.D., M.Sc., F.R.C.P.I.

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Convulsions under Trilene Anaesthesia

This case of convulsions occurring under trilene anaesthesia is of interest not only because I can find no other case reported in the recent literature on trilene, but because several of the factors usually seen when convulsions occur under anaesthesia are absent.

Case Record

The patient was a pale nervous youth aged 17, and the operation to be performed was for cure of a right hydrocele. Routine examination of the chest revealed no abnormality. He had undergone two operations previously—one for an acute mastoid when 3 years old, following which he had pneumonia; the second for hernia when he was 12. There was no history of epilepsy.

The premedication given was omnopon gr. 1/3 and scopolamine gr. 1/300 one hour before operation; 0.5 g. of hexobarbitone was given intravenously, followed by nitrous oxide, oxygen, and trilene (using a Boyle's apparatus with the trilene in the chloroform bottle). No carbon dioxide was used. Anaesthesia was smooth and the patient's colour good; about 18% oxygen was given most of the time. No pulse irregularity was noticed, and the respiration rate was slightly raised. Twenty minutes after induction had started, and with the patient in the first plane of third-stage anaesthesia, dissection of the hydrocele sac was proceeding when the respirations rather abruptly became irregular and shallow, then ceased. No twitching of the face was noticed, but contraction of the neck muscles was felt at the same time. The patient became cyanosed, and clonic convulsions supervened, involving the whole body, so that the patient had to be held down on the table. These continued for about one minute. The anaesthetic was discontinued

immediately and oxygen and carbon dioxide were administered, with rhythmic pressure on the bag, as, although the airway was clear, there was complete cessation of respiration. The pulse remained regular throughout, though the rate increased during the convulsions. The latter ceased, the patient's colour improved, and respiration recommenced in about three minutes. The operation was concluded under nitrous oxide and oxygen with no recurrence of the fits. The patient's condition seemed satisfactory on leaving the theatre, but he became cyanosed on return to the ward, where he was given oxygen intranasally. His recovery since then has been normal, and his condition now (a week later) is satisfactory. Morning and evening temperatures on the day of operation, and also the temperature taken immediately after the operation was completed, were normal. The temperature of the theatre was 74°.

The patient was never deeper than the first plane of anaesthesia, and only about 2 drachms of trilene was employed. This was taken from a newly opened bottle, some of which had already been used on other patients without ill effects.

COMMENT

If it may be assumed that convulsions occurring under anaesthesia are not specific to any particular anaesthetic, then this case is unusual in that pyrexia and infection, which so often are predisposing conditions, were absent. Another point to note is that no atropine had been given, and only a small dose of scopolamine. Barbiturates and possibly morphine are regarded as inhibiting factors, and the patient had been given both. The airway was clear and there was no element of anoxia up to the onset of muscular contractions. I do not think that the sensory stimuli being produced at the time of onset were strong enough to initiate the convulsions. It has been suggested that convulsions can be caused by carbon dioxide imbalance, and it seems possible that in this case the slight hyperpnoea caused by the trilene may have resulted in a low alveolar concentration of carbon dioxide, following which came the period of apnoea with spasms. In favour of this was the speedy recovery when carbon dioxide with oxygen was administered.

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Adder Bite

In view of the renewed interest taken in adder bite in Great Britain the following case may be worthy of record.

A W.A.A.F. patient aged 23 was admitted at 3.15 p.m. on July 6, 1942, to the medical department of the Newcastle General Hospital under the care of Prof. Hume. She gave a history of having been bitten by an adder in the region of the left internal malleolus at 4.30 p.m. the day before. A few minutes after the bite she noticed a swelling of her tongue and some difficulty in swallowing, swelling of the eyelids, and a gradually increasing swelling of the left leg. The swelling of the tongue lasted three hours, that of the eyelids five hours. She vomited a few times and had some abdominal pain at midnight.

On admission her general condition was good. There was a slight pyrexia of 99° F. The left leg showed a marked swelling up to the inguinal region. The skin temperature of the swollen leg was increased, and there was an erythematous rash on the medial side of the calf extending to the knee-joint. Two minute marks of fangs were seen in the region of the internal malleolus, and according to the patient these marks corresponded to the seat of the snake bite. No other abnormalities were found. The patient had complete bed-rest and no other treatment. The temperature returned to normal next day, and the swelling of the leg gradually subsided. In about two weeks the oedema had completely disappeared and the patient was allowed to get up. After three weeks she was discharged from the hospital, the bitten limb being normal in every respect.

I would like to take the opportunity of raising the question of serum treatment of adder bite. Is there any specific or satisfactory polyvalent serum against adder bite in Great Britain, and, if so, is the serum to be administered in every instance? In our case, though the patient's general condition was not much affected, there were pronounced toxic (allergic) signs, which cleared up spontaneously within two weeks.

I wish to express my thanks to Prof. Hume for his help and suggestions, and to Dr. J. A. Charles, medical officer of health, Newcastle-upon-Tyne, and Dr. G. P. Harlan, medical superintendent of the Newcastle General Hospital, for permission to publish this case.

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Reviews

EVOLUTION

Evolution: The Modern Synthesis. By Julian Huxley, M.A., D.Sc., F.R.S. (Pp. 645. 25s.) London: George Allen and Unwin. 1942.

A book on evolution may be concerned with whether it happened, what happened, and how and why it happened, whilst a preface by Shaw on the subject describes how it ought to have happened. Huxley's book is mainly concerned with how and why. He is certainly better equipped than any other British zoologist to answer these questions, for he has made personal contributions to genetics and natural history which allow him to write with authority on both topics, and has discovered quantitative laws of growth which apply both in the development of the individual and the evolution of species. His knowledge of the literature is most impressive; indeed, no writer on the subject since Darwin has produced such a body of facts from different sources in support of his standpoint.

Huxley is a Darwinist in the sense that he believes that the main trends of evolution were determined by natural selection, and not by inheritance of the effects of use and disuse, by an inner urge, or by supernatural guidance. And he holds that the steps have generally been small. But he admits that some species have arisen by sudden leaps, and that the evolutionary paths possible for a species are more limited than Darwin seems to have thought, among other things by the gene mutations available.

A large part of the book deals with the different ways in which species may originate. Where the barrier is spatial—for example, a mountain range—they may hybridize readily on meeting. Where it is one of habit—for example, a difference of flowering time or mating instincts—the hybrids may be quite fertile when formed. But, especially in higher plants, a reorganization of the nucleus may give fairly complete intersterility in a single step.

Medical readers will perhaps be disappointed that Huxley has not dealt in more detail with man. A good deal of human mortality is selective, apparently against predisposition to disease. And since men began to acquire skill with their right hands, human evolution has probably centred round the development of the left cerebral cortex. However, he deals vigorously with the fallacy which one still finds in some medical writings, that natural selection necessarily makes for progress. This is particularly far from the truth in a dominant species such as man, whose members, as a result of selection, may become better equipped for overcoming one another, and worse so for overcoming their environment.

In spite of this every reader who has kept an interest in zoology, and particularly in natural history, will find *Evolution* a unique storehouse of information; and for many years to come it will be absolutely indispensable for any serious study of the questions with which it deals.

J. B. S. HALDANE.

SUBACUTE BACTERIAL ENDOCARDITIS

Subacute Bacterial Endocarditis. By Emanuel Libman, M.D., and Charles K. Friedberg. Reprinted from Oxford Loose-Leaf Medicine. (Pp. 108. 15s.) London, New York, Toronto: Oxford University Press. 1942.

While the new chemotherapeutic agents have given striking results in the treatment of certain infections, bacterial endocarditis remains one of those which are usually uninfluenced by these drugs. Drs. E. Libman and C. K. Friedberg have written this monograph on subacute bacterial endocarditis in the hope that wider knowledge of the malady may lead to earlier diagnosis and more successful treatment. Among predisposing factors are mentioned previous valvular disease or defects, physical and mental strain, influenzal infection, operative procedures (notably dental extractions), and pregnancy and the puerperium. The section on symptomatology contains a useful survey of skin lesions, including petechiae, subungual splinter haemorrhages, Osler lesions (which are attributed to arteriolitis rather than embolism), and the less common Janeway lesions.

That subacute bacterial endocarditis may develop in many guises is shown by the authors' list of syndromes, in which

the disease is demonstrated as simulating influenza, pulmonary tuberculosis, rheumatic fever, typhoid fever, malaria, myocardial failure, hepatic or subphrenic lesions, reno-vesical disorders, gastric carcinoma, acute appendicitis, and cerebral lesions. One of the most important sections of the work is that devoted to the "bacteria-free" stage of the disease: in this phase the patient is afebrile, the skin lesions are infrequent, the anaemia persists, but a leucopenia may replace the usual leucocytosis. Sternal tenderness is mentioned more than once by the authors, but most clinicians who have sought help from this sign will probably agree that it is an uncommon phenomenon. It is not surprising that Drs. Libman and Friedberg take a poor view of prognosis; it is even perhaps remarkable that they put the spontaneous recovery rate as high as 3%. This is an important monograph on a dramatic but depressing disease.

SIR WILLIAM WILDE

Victorian Doctor. Being the Life of Sir William Wilde. By T. G. Wilson, M.B., Litt.D., F.R.C.S.I. (Pp. 338. 15s.) London: Methuen and Co.

To most of those few who remember him at all the name of Sir William Wilde is merely that of "Oscar Wilde's father." Yet the reader of Dr. T. G. Wilson's *Victorian Doctor* will readily admit that William Wilde deserves a biography in his own right—far more, indeed, than his much-publicized and unhappy son. His biographer claims for him that it was he who first put aural surgery on a scientific basis. Certainly he was the leading aurist and ophthalmologist of his day, and his hospital, St. Mark's, for years the pioneer on aural teaching in these islands. Famous throughout Europe, in Dublin he was a legendary figure, and society flocked to the house in Merrion Square where Sir William and his no less remarkable lady entertained. His greatness was not confined to surgery: he had travelled far and read widely, and he made important contributions to Irish archaeology. His last years were a period of decline, for the notorious Travers case marred his zenith. He gave less time to surgery and more to archaeology and his beloved Connaught. He died at sixty, eccentric and embittered, a quaint figure, jeered at by the children of the streets. To-day this is the only period that is remembered, even in Ireland which he served so well, and Dr. Wilson's biography is a service not only to his memory but to the history of medicine.

Wilde's was a full life, and he lived it in an age of change. Born in the year of Waterloo, he was a student in the days of body-snatching, worked in the horrors of the famine years, and lived to see the birth of antiseptic surgery. The years of his prime were the heyday of Dublin medicine, and the background of Dr. Wilson's story is richly laced with the great figures of Stokes, Graves, Colles, Crampton, and Corrigan, men whose fame has lived where Wilde's has faded. These, with the picture of the Ireland of his day, give the central figure its perspective. Nor does he lose stature by their proximity. Brilliant, imaginative, and active, entirely human in his virtues and in his vices, William Wilde has real greatness, and Dr. Wilson's admirable and delightfully written biography does him but justice.

TUBERCULOSIS IN CHILDHOOD

Tuberculosis in Childhood. By Dorothy Stopford Price, M.D. With a chapter on Tuberculous Orthopaedic Lesions, and other contributions, by Henry F. MacAuley, M.Ch., F.R.C.S.I. (Pp. 215; 87 illustrations. 17s. 6d.) Bristol: John Wright and Sons, Ltd. 1942.

It is still too common a belief that primary tuberculosis in childhood is an infection acquired and overcome by every child, with minimal, if any, disturbance of health and without significant sequelae. Occasionally we even hear the opinion expressed that such an infection is a "good thing," since by its means immunity is acquired to tuberculous disease later in life. Dr. Dorothy Price firmly, and quite rightly, believes that "many vague symptoms of ill-health besides actual disease" can be attributed to the tubercle bacillus, and that primary tuberculosis is of great importance not only because it can be immediately fatal but because it may give rise to various forms of the disease which cause severe ill-health and may prove fatal later. Dr. Price not unjustly expresses a strong opinion that too little attention is paid to this subject in this country, and therefore her book "is intended to be a brief practical guide to the diagnosis and treatment of tuberculosis in children." Now there can be no doubt that Dr. Price has read widely the relevant literature and has herself had ample material on which to base a personal study. But, judged by the standard the author herself has set, the book is not likely to achieve its purpose. In spite of its format, it is not brief (there is much repetition) nor is it written as a "guide" should be: indeed, the reader seeking guidance for everyday practice may often be confused. The pathological background of tuberculosis is not simple, and cannot be simplified by a rigid use of the three-stage classification, which is forced on the reader on almost every page. Even more unfortunate is Dr. Price's insistence on immunological associations with the three stages, which themselves have little practical meaning in connexion with tuberculosis in childhood. There are other grounds for criticism. Thus the author states: "The foci which initiate tertiary phthisis show a marked tendency to caseation in contrast with the focus of primary tuberculosis." Clearly for "caseation" we must read "liquefaction." The following speaks for itself: "When a child is known to have passed successfully through a primary tuberculous infection and then dies some years later of tuberculous meningitis, the state of affairs is rather different from acute meningitis. These cases are uncommon; they are usually the result of a fall or blow on the head." Dr. Price revives mediastinal gland tuberculosis as "a clinical entity in which the primary lung focus is closed, but the tuberculous process in the mediastinal glands remains active." She has an unjustified belief in the value of the Hamburger ointment test and in the conclusions to be drawn from its sole use. Finally, one would need much more than the figures given by the author to convince us that "if all pulmonary cases were diagnosed during primary infection, and treatment instituted, there would be complete cure in very nearly 100 per cent."

In spite of the severe criticisms expressed, we would advise paediatricians and tuberculosis workers to read the book, not only because it contains useful and important matter, but also because it is based on a point of view fundamentally different from that current in this country.

Notes on Books

Food and Beverage Analyses, by Dr. M. A. BRIDGES and Miss M. MATTICE (2nd edition, Henry Kimpton, 20s.), provides readily accessible information on all that may be asked regarding the contents of articles of food and drink. The information covers nutritive and calorific values, quoting the percentages of carbohydrate, protein, and fat, and indicating the intake usually practised for each article. It also gives tables showing the proportions of all the mineral constituents contained in them and their values in terms of the several vitamins. The range of information is very extensive; hardly any article of diet is omitted. A general discussion of dietetic requirements and the function of vitamins completes a very useful volume.

Dr. A. H. DOUTHWAITE has again edited *Hale-White's Materia Medica, Pharmacy, Pharmacology and Therapeutics* for its 25th edition (J. and A. Churchill, 14s.). This incorporates 71 additions to the *British Pharmacopoeia* that have appeared in the official addenda. In spite of extensive additions the size of the book has shrunk without any loss of legibility. Near the index is a list of drugs which must not be prescribed during wartime or in which strict economy should be exercised by reason of their scarceness. The parts of the volume most thoroughly revised for this edition include the chapter on sulphonamides, which has been rewritten and expanded; and Dr. P. M. F. Bishop has revised his contributions on the subject of the sex hormones. Sir William Hale-White must look with pride upon this evergreen manual which he first gave to the medical profession fifty years ago—one of the good things that came from Guy's and have remained "in the family."

The calendar of the Royal College of Surgeons of England for 1942 (Taylor and Francis, Ltd., Red Lion Court, Fleet Street, 2s. 6d.) is even smaller than its predecessor, having 200 pages compared with 226 pages for 1941. Before the shortage of paper began to become progressively more acute the pages numbered well over 600. All the current official information is given, and the register of Fellows in alphabetical order, with their addresses, has reappeared, taking the place of the regulations for the diplomas and the licence in dental surgery. The Roll of Honour is now nearly twice as long as in 1941.

ACTIVITY IN REHABILITATION

BY

Sir ROBERT STANTON WOODS, M.D., F.R.C.P.

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When a member of the rescue squad gingerly removes the debris from the limbs of the entombed air-raid victim, or a stretcher-bearer picks up the wounded soldier, he takes the first step in a long series of activities destined to rehabilitate or restore to health the casualty he has rescued. Every phase of the patient's subsequent treatment—first-aid, resuscitation, operation, blood transfusion, skin-grafting, physiotherapy, psychotherapy, supervised exercises, occupational therapy, vocational training—is part of a well-ordered plan with one object in view: that of returning the injured person to the fullest possible living and working capacity.

Such a plan, whereby the industrial or war casualty is followed through from the injury to his return to work, is fundamental in the organization of the Emergency Medical Service. At no period has the pronouncement "The operation was successful but the patient died" ever been more than a popular gibe. Paraphrased, however, as "the fracture was successfully set but the limb completely useless," it becomes relevant to what not seldom occurred in the recent past when the unfortunate victims of injury were sent out into the world with the not unfamiliar rigid joints, the wasted claw-like hands; so that, encountering them, one was at times forced to the conclusion how much better a really good artificial limb would have been.

Early Application of Physical Measures

With the extension of modern rehabilitation facilities came the widespread realization that physical measures for restoring function—massage, electrical stimulation, remedial movement—must, to be effective, be applied early, in many cases from the beginning of treatment. The fracture case is no longer merely a broken bone to be joined together in good alignment, but a bone clothed in muscles, whose blood and nerve supply must be maintained throughout in the face of enforced immobilization, and in which healing must keep pace with the bony union. Massage, electrotherapy, assisted movement, afford very necessary and very effective means for maintaining the ebb and flow of blood and lymph in a muscle which must not or cannot be moved by the patient himself.

But as soon as the patient *can* move the injured part with safety, such purely local and passive measures of restoration may in the majority of cases be abandoned with advantage in favour of active therapy, since the muscle stimulus most potent for good is the one coming from the central nervous system. As the patient's muscles contract in voluntary effort they promote the blood and lymph flow and bring fresh supplies of nutrient fluid to the injured tissues by a much more physiological mechanism than that of artificial stimulation. Furthermore, these nutrient fluids bathing the injured area must possess certain biochemical properties if optimum healing is to occur. Thus the health and general muscle tone of the patient have to be considered, the scope of rehabilitation is widened still further to include dietetics and general exercise, and we are no longer dealing with an injury but with an injured body.

Quite apart from the economic fear, the dread of losing one's job, of having to be kept by relations or by the State, even the merely temporary loss of use in an arm or leg can be accompanied by serious mental depression peculiarly inherent in this type of illness, since movement, one of the fundamental attributes of living matter, is as natural and necessary as breathing and eating. The patient becomes convinced that he is crippled, paralysed; he will never be any good again. Once the disabled person can be shown that he can throw a dart or kick a football or hammer in a nail or work a loom almost as well as the next patient and certainly better than he himself did yesterday, he is on the road to recovery, mental as well as physical. And now we are no longer dealing with an injured body, but with an injured person—body, mind, spirit.

Purposeful Movements of Muscle Groups

Even stereotyped voluntary movements of the injured part alone, since they demand the patient's co-operation and introduce the element of self-help, are excellent psychologically. Of far greater therapeutic value are purposeful and productive movements of groups of muscles such as those required in the performance of games and handicrafts, or the resumption of Army training, where the creative and competitive instincts can be brought into action and the patient's attention is no longer focused on his disability but rather on his returning skill in achievement. It is better still when he can actually forget himself in the interest and usefulness of the work or the sheer enjoyment of the game so that muscular co-ordination is achieved automatically and without conscious effort.

The importance of activity in recovery is not confined to injuries. Before and after an abdominal operation, before and after childbirth, in recovery from many illnesses, and very especially in the treatment of the psychoneuroses, active and productive exercise now plays a prominent part in treatment. In a certain Army convalescent depot of 1,000 beds, as at present constituted, 25% of those undergoing active rehabilitation come under the category of "hernia."

Medical Supervision

All these therapeutic measures ought to be under the direct supervision of an instructed medical practitioner, whilst the patients are guided at their work and play by a staff of male and female medical gymnasts and occupational therapists. In this way only such movements as are safe and effective in any given case are performed, and the range of activity is gradually increased with the patient's increasing capacity.

Planned at first to deal with air-raid victims only, the E.M.S. later afforded accommodation for Service casualties, and later still its orthopaedic and fracture centres have become extended and will co-operate in the ambitious scheme for industrial rehabilitation now on foot. It would seem that the demands of such an elaborate and growing organization for trained masseuses must become for a time increasingly difficult to meet. Fortunately, however, the problem is being partly solved by the more widespread use of active than of passive physical treatment. Not only does the patient benefit mentally and physically, as we have seen, by the increasing use of active rehabilitation, but whereas in the past a masseuse might spend three-quarters of an hour giving passive treatment (massage and electrotherapy) to one patient, or could treat at the most only two patients simultaneously, she can now give active treatment in medical gymnastics to eight or nine patients at the same time. Passive therapy still has an important place in rehabilitation, but as soon as the injured part can be used at all the physician or surgeon in control makes his decision as to how far active therapy can be substituted. The earlier this can safely be brought about the more rapid the patient's recovery and the greater the saving in trained personnel.

MEDICAL SICKNESS AND LIFE ASSURANCE

The annual meeting of the Medical Sickness, Annuity and Life Assurance Society, Ltd. (whose registered offices are now at Highfield, Chesterton, Cirencester), was held in London, with Mr. R. J. McNeill Love, chairman of the Board of Directors, presiding. Reference was made to the heavy personal losses the Society has suffered during the year in the death of its chairmen, Dr. F. C. Martley and Dr. G. de Bec Turtle, and of Sir William Willcox, who had been a member of the Board for more than twenty years.

The chairman said that the amount of new business in the Life Assurance Fund was only slightly smaller, but the claims by death had been lighter and the surrenders fewer. On the Sickness Fund the claims had been considerably lighter and the premiums were up a little. The funds of the Society had been increased by £173,537, and now stood at £2,355,319. The quinquennial valuation had taken place at the end of the year under review, and on a cautious estimate a surplus of nearly £83,000 was disclosed on the Life Assurance and Annuity Fund and of £120,850 on the Sickness Fund. Both Funds had been strengthened and provision made for all known contingencies.

A vote of thanks was accorded to the staff on the motion of the chairman, who mentioned that Mr. Bertram Sutton, the manager and secretary and now one of the directors, had been with the Society for 43 years, 30 of which had been in the capacity of chief officer.

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CONTROL OF VENEREAL DISEASE

The use of compulsory measures for the control of venereal disease has been debated often enough, and now, under Defence Regulation 33B, powers are made available to apply compulsion in certain carefully defined circumstances. As a statement from the Ministry of Health published at p. 616 makes clear, this limited compulsion leaves the voluntary basis unchanged. In brief, the regulation provides that persons named by two separate patients as the suspected source of infection can be required by the M.O.H. of the county or county borough in which they live to attend for examination and, if necessary, for treatment by a special practitioner.

It may be recalled that when in 1928 the Edinburgh Corporation introduced a Bill which, following the Swedish model, was among other things to authorize the M.O.H. to serve a notice on defaulters to complete treatment until certified cured, it was defeated in the House of Commons by 156 votes to 93. In 1923 the Trevethin Committee concluded that legislation was impracticable and inadvisable. In 1937 the Minister of Health sent a commission of experts to study the conditions in Holland and the Scandinavian countries.[1] The commission doubted whether compulsion was justifiable in view of their conclusion that in Holland and this country voluntary measures of treating venereal disease "have been almost equally successful" in controlling these diseases as in the Scandinavian countries. This conclusion has been challenged.

Defence Regulation 33B once more opens the question of compulsory notification and treatment of diseases which, however small in extent in peacetime, nevertheless constitute a serious public health and social problem. It is well, therefore, to consider briefly the arguments for and against, so that the medical profession and through it the public may have their minds clear on the subject. The success of the voluntary basis of treatment must in the long run rest upon fully informed medical and lay opinion, and upon a healthy attitude of mind towards sex and diseases which in the main arise from promiscuous sexual intercourse. As Dr. Margaret Rorke pointed out in this *Journal*,[2] "There is not the same sense of shame and necessity for secrecy as regards venereal disease in Scandinavia as still exists in England." The Scandinavian peoples seem to have a more matter-of-fact attitude towards sex—a public health official in one large Scandinavian city strongly advocated the supply of contraceptives through automatic machines. Sir Wilson Jameson, the Chief Medical Officer to the Ministry of Health, performed a great service when he broke the V.D. taboo in a broadcast given at the end of last month, and struck the right note when he invited the public to look upon venereal diseases in the same way as a doctor did, regarding them as presenting the same sort of problems as other infectious diseases. He decried the hush-hush attitude that prevails in a country where puritanism and hypocrisy are at times not easily distinguishable from each other. This broadcast, with the official background behind it, was an important step towards that enlightenment which is essential if voluntary measures are to succeed in controlling venereal infections. In the past the British Social Hygiene Council has battled manfully with this problem, but the success of its propaganda efforts was rather sharply challenged by Col. L. W. Harrison at a meeting of the Medical Society for the Study of Venereal Disease in March of this year.[3] He criticized county councils and county borough councils for a lack of zeal in acting upon propagandist advice issued by the Ministry of Health, and at conferences early in 1939 with medical officers of health and venereal disease officers he found no great enthusiasm for the use of lectures and films as a means of instructing the public. Numbers attending courses of instruction, lectures, exhibitions, and film shows organized by the British Social Hygiene Council during the ten years 1930-40 were analysed by Dr. Hartley of Scientific Computing Services, Ltd., and this analysis, according to Col. Harrison, brings out that 944 persons in every 1,100 could not have attended a lecture or film show on the subject more than once in the ten years. He asks the question, "Could they [i.e., lectures and films] have made much more improvement than the posters displayed in the public lavatories?" Various speakers at the meeting did not share Col. Harrison's scepticism about lectures and films—and incidentally he made it clear that his remarks should not be considered as an attack on the B.S.H.C.

If we accept the view that propagandist efforts in the past have had very limited value, this does not imply that they will have as little value in the present and the future, but it may be that the time, energy, and money spent on such propaganda could be more fruitfully used for other purposes if notification and treatment of the disease were made compulsory. The case for compulsion was forcefully put by Major S. M. Laird[4] at a meeting of the Medical Society for the Study of Venereal Disease in April this year. An investigation in which he took part in 1937 showed that in various parts of Staffordshire 50% of cases of early syphilis and 30% of gonorrhoea defaulted. Sir Kingsley Wood, when Minister of Health, stated that the percentage of clinic patients in England who completed treatment and tests of cure was 12.9 in 1925 and 17.5 in 1935. Major Laird points out that the defaulter rate of England in 1935, at 82.5%, compares most unfavourably with the corresponding defaulter rate of 2.5% for Sweden. This and other comparable figures make it impossible for him to agree with the conclusion of the British commission in 1937 that "the degree of success in reducing the incidence of syphilis in the countries employing compulsory treatment and in those which rely on a voluntary system is broadly similar." After the discussion which followed Major Laird's paper, the Medical Society for the Study of Venereal Disease passed the following resolution with an overwhelming majority: "That in the opinion of this meeting . . . further powers, legislative and administrative, in the treatment and prevention of venereal diseases are required to deal with the sources of infection, contacts, and defaulters."

The arguments adduced by the British commission against compulsory measures were that they (1) may induce the infected to conceal the disease from fear of exposure, (2) are not easy to apply in such a densely populated country as this on account of the difficulty in tracing those who try to evade the law, (3) may open the way to blackmail, and (4) are not consonant with the British idea of the liberty of the subject. If we share Sir Wilson Jameson's view—as we must—that venereal infections present to medical men problems similar to those of other infections, then it would seem a little late in the day to talk about the liberty of the subject in this

[1] *British Medical Journal*, 1938, **1**, 1224, 1277.
[2] Ibid., p. 1224.
[3] *Brit. J. vener. Dis.*, July–October, 1942, **18**, 77.
[4] Ibid., p. 84.

context. The medical profession and the public have accepted without demur the compulsory notification of small-pox, diphtheria, scarlet fever, whooping-cough, typhoid, and other infectious diseases. They raise no objection to a law which may inflict a penalty upon any person who, "(*a*) knowing he is suffering from a notifiable disease, exposes other persons to the risk of infection by his person or conduct in any street, public place, place of entertainment or assembly, club, hotel, inn, or shop, or, having the care of a person whom he knows to be so suffering, permits him to expose others to the risk of infection in any such places, or (*b*) knowing he is suffering from a notifiable disease, engages in any trade, business, or occupation which he cannot engage in without risk of spreading the disease."[5] Nor is any voice raised against the regulations which make it possible to remove to hospital any person suffering from a notifiable disease, "(*a*) if his circumstances are such that proper precautions cannot be, or are not being, taken to prevent spread of infection, and (*b*) that serious risk of infection is being caused to other persons."[6] There is no need to elaborate the argument which distinguishes licence from liberty, especially when it is a question of the liberty to pass on venereal disease. In considering the other objections to compulsion, we believe that it should not be difficult to make adequate safeguards against blackmail or the spread of misinformation through malice. It cannot be denied that compulsory measures are more easily enforced in less densely populated countries, such as Sweden, Norway, and Denmark, and in Great Britain the control of venereal disease in the ports must always be a difficult matter. Whether these difficulties would be greater or less with compulsion is an open question. The most formidable objection to compulsion is that it might carry with it a risk of driving the disease still further underground because of the fear of public exposure on the part of infected persons. But, provided adequate steps are taken to maintain the confidential relationship between patient and doctor, and provided venereal disease centres are made inconspicuous by, for example, their inclusion in institutions where other clinic work is carried out, the risk would appear to be minimal, and it would be the duty of public health authorities, by propaganda, to convince the infected that knowledge of their disability would be a private matter between them and the medical profession. Fortunately modern medicine can offer effective treatment for venereal diseases, and is, therefore, in a strong position to insist, if it wishes so to do, that infected persons should be treated and that such treatment should be carried to completion. If treatment were of little avail, then a suspicious public might accuse the medical profession of a wish to pry into its intimate affairs.

It should be made clear that the question of compulsory notification is not raised in Defence Regulation 33B, but this question will no doubt arise in time. When it does we can only hope that both doctor and public will discuss it in objective terms so that a reasoned conclusion may be arrived at. Meanwhile every possible step must be taken to stem the increase of venereal disease that has inevitably occurred in this war. So far official advice is rather like the well-known advice from *Punch* to those about to marry. We cannot, of course, expect that health authorities in this country would go so far as the Scandinavian public health official referred to above; as things are at present many believe that the issue of prophylactics is more likely to be successful in the prevention of venereal disease than the issue of moral and hygienic propaganda.

[5] Public Health Act, 1936, Sects. 148–9.
[6] Ibid., Sects. 169–70.

CAVERNOUS SINUS THROMBOSIS

Cavernous sinus thrombosis is a comparatively rare condition. Smith[1] in 1918 could collect only 300 cases from the literature. The majority are secondary to sepsis of the face and orbit and show the classical signs of chemosis, exophthalmos, and ocular palsies. A more chronic type with much less distinctive symptomatology occurs in association with ear disease. Aseptic thrombosis is also occasionally found as a terminal marantic event. Grove,[2] in a comprehensive review in 1936, concluded that the mortality of the anterior fulminating type was probably 100% and that the recovery rate of all types—traumatic, aseptic, and septic—was not greater than 7%. Several methods of surgical approach to the sinus have been described which aim at drainage and ligation of the venous channels. Grove found these methods more disappointing than when the original focus alone was treated surgically, the operation being combined with ligation of the common carotid as described by Eagleton.[3]

In the past few years there have been several reports of recovery with the use of drugs of the sulphonamide series. Seydell[4] and Barnshaw[5] have both reported cures with sulphanilamide. Barnshaw's patient was a child of 7 who had a bilateral infection after a stye on the eye. He used 10 c.cm. of prontosil 4-hourly for 6 doses and then sulphanilamide 10 grains four times a day for 4 days: in spite of the short course of treatment the child recovered completely. Morrison and Schindler[6] treated a boy of 5 years successfully with sulphapyridine; they gave a total of 63 grammes of the drug and maintained the blood concentration between 10.4 and 16.5 mg. per 100 c.cm. for 9 days. Wolfe and Wolfe[7] were the first to use sulphathiazole. Their patient was a boy of 17 who developed signs of thrombosis after a furuncle of the nose. He was first treated with small doses of sulphanilamide, but as soon as *Staph. aureus* was isolated from the blood stream sulphathiazole was substituted in doses of 2 grammes every 4 hours, maintaining a blood concentration between 10.0 and 17.6 mg. per 100 c.cm. The dose was reduced after 14 days and continued for another 15 days. Moore *et al.*[8] also used sulphathiazole in very large doses, securing a blood concentration between 25 and 33 mg. per 100 c.cm. for 6 days. Their case was complicated by multiple embolic phenomena, but eventually, apart from some mental impairment, the patient recovered. The drug was continued in small doses for three months after the infection subsided.

Heparin has recently been combined with chemotherapy. Lyons[9] was the first to apply the treatment to this type of thrombosis. His object was to prevent extension of the thrombosis and dissemination of infected emboli. The heparin was given by continuous intravenous drip in amounts sufficient to maintain the blood coagulation time at approximately 90 minutes. Heparin treatment was kept up for 15 to 20 days, sulphathiazole being given concurrently in large doses and continued for some 3 to 4 months after the infection had subsided. Both the cases described developed pulmonary infarcts during treatment. Leroy Schall,[10] with the same method, had no haemorrhagic manifestations in his two cases. Erschler and Blaudill[11] were not so fortunate. Their patient, a girl of 22, developed

[1] *Arch. Ophthal.*, Chicago, 1918, **47**, 482.
[2] *Arch. Otolaryng.*, Chicago, 1936, **24**, 29.
[3] *Cavernous Sinus Thrombophlebitis*, New York, 1926.
[4] *Arch. Otolaryng.*, Chicago, 1939, **30**, 429.
[5] *J. med. Soc. New Jersey*, 1939, **36**, 22.
[6] *Arch. Otolaryng.*, Chicago, 1940, **31**, 948.
[7] Ibid., 1941, **33**, 81.
[8] *J. Amer. med. Ass.*, 1942, **119**, 708.
[9] *Ann. Surg.*, 1941, **113**, 113.
[10] *J. Amer. med. Ass.*, 1941, **117**, 581.
[11] Ibid., 1941, **117**, 927.

sinus thrombosis after nasal furunculosis. Sulphathiazole and heparin were given and a blood concentration of 8.15 mg. of sulphathiazole per 100 c.cm. was maintained. On the second day of the heparin therapy the patient had haematuria, and by the ninth day she was passing clots of blood in the urine, and purpura, ecchymosis, and haemorrhages into the joints had appeared. Both forms of treatment were stopped for 36 hours, but as there was a recurrence of chills and fever the sulphathiazole was restarted and continued for 13 days. There was no recurrence of haemorrhage, and the patient made a complete recovery. *Staph. aureus* is the infecting organism in the majority of cases of cavernous sinus thrombosis, and therefore penicillin is the ideal remedy; at least one encouraging example of its use has been reported.[12] Until penicillin becomes available for general clinical use, sulphathiazole is the sulphonamide of choice. It should be given in large enough doses to obtain a blood concentration of about 10 mg. per 100 c.cm. during the acute stage, and it is probably wise to continue treatment in small doses for about 3 months after the original infection has subsided. From the few published cases it would appear that this drug has revolutionized the prognosis in cases of septic cavernous sinus thrombosis. While theoretically there is an indication for the use of an anticoagulant, there is no evidence that this gives more satisfactory results than when sulphathiazole is used alone, and any theoretical advantages are outweighed by the risk of severe haemorrhagic reactions.

CLINICAL IMPORT OF RECENT WORK ON VITAMIN A

From prolonged research on the influence of a shortage of vitamin A on the central and peripheral nervous systems, Sir Edward Mellanby has recently concluded that the degeneration observed is due to pressure exerted by the overgrowth of the bone contiguous with the affected tissues. In 1938[13] he showed that a dietary deficiency of vitamin A resulted in bony overgrowth of the periosteal layer of the labyrinthine capsule, especially of that part surrounding the internal modiolus. The dogs on which his experiment was made showed incoordinate movements of locomotion and evidence of deafness. The overgrowth of bone must press on and in some places touch the nerve, which seems to cause its degeneration. A similar hyperplasia was found in the neighbourhood of the optic and trigeminal nerves, and this may be the cause of the xerophthalmia associated with vitamin A deficiency.[14 15] In advanced stages of the deficiency serous labyrinthitis was found; this was cured by giving vitamin A, though the nerve degeneration was not. Substituting potatoes for the cereals in the diet greatly reduced the nerve degeneration. It was suggested that the small amount of carotene in the potatoes eaten was enough to account for their action or that the cereals had a toxic action which hastened the pathological changes in the absence of vitamin A. The deficiency produced more severe changes in the bones of young animals than of adults. Large reserves of vitamin A postponed the development of symptoms.

In 1941[16] Mellanby described more fully these bone changes affecting the nervous system. He concluded that a function of vitamin A is to limit the number and the degree of activity of osteoblasts and osteoclasts, a deficiency resulting in proliferation of cancellous at the expense of compact bone and causing many bones to lose their normally fine moulding and outline and to become thickened and enlarged. Overgrowth of the cranial bones may press on and produce deformity of parts of the brain. The greatest hypertrophy was found in the bones forming the posterior fossa of the skull, so that the medulla oblongata, pons, cerebellum, and nerves in close association with these parts of the brain are more particularly affected. The posterior root ganglia and the anterior root nerves of the spinal cord may also be squeezed and the nerve fibres destroyed by overgrowth of the vertebral bones. The bone overgrowth and degenerative changes in nerve are greatest in the cervical region of the cord. In advanced cases of this deficiency there is evidence of a substantial rise in intracranial pressure. The pressure of the cerebrospinal fluid in the cisterna magna may be double that of animals receiving similar diets containing vitamin A. Associated with these changes, the cisterna magna and the fourth ventricle are diminished in capacity, while a degree of internal hydrocephalus (expansion of the third and lateral ventricles) indicates increased pressure, probably transmitted from the posterior fossa.

12 *Lancet*, 1941, **2**, 177.
13 *J. Physiol.*, 1938, **94**, 380.
14 *IIIe Congrès neurologique international: Comptes rendus*, 1939, p. 797.
15 *J. Physiol.*, 1939, **96**, 369.
16 Ibid., 1941, **99**, 467.

LONDON'S BILL OF HEALTH FOR 1941

In the second full year of war London—by which is meant the county, with a population of 4 million or thereabouts—remained remarkably healthy.[1] Even the biennial rhythm of measles epidemics was broken. The expected outbreaks of contagious disease consequent upon shelter life did not materialize. Influenza, pneumonia, and bronchitis claimed fewer victims. Small-pox and typhus went unrecorded. Scarlet fever, which fifty years ago had a death-roll of four figures in London, was the cause of only 2 deaths in 1941. The deaths from diphtheria and whooping-cough rose slightly, but the totals remained small. Notifications of diphtheria multiplied by 4 compared with the year before, but even so the total was only 600, and the deaths in 1940 and 1941 together were fewer than in 1938. Pulmonary tuberculosis caused some disquiet by reason of an increase in notifications, but the number of deaths was down. Maternal mortality went back, unfortunately, to the higher rates of 8 or 9 years ago, and the infant death rate rose to the 1938 figure of 57 per 1,000 births; but even the 1938 figure was considered a low one at the time. Deaths from street accidents fell by one-third. The school medical service reported that of the children examined in four age groups 93.7% were of satisfactory nutrition, compared with 93.4% in the last pre-war year. Venereal disease clinics had fewer cases, but here, of course, it must be remembered that a large proportion of the population of the ages at which venereal disease is most likely to be acquired were no longer civilians. That illustrates one of the possible fallacies which underlie these cheerful statistics. The population of London has altered so much as a result of war conditions that there is no certain base-line from which to calculate percentage rates and make comparisons with normal years. Successive evacuations have taken place, but very many evacuees have returned. In the year under review the number of elementary school children in London in January was 85,000 and in December 150,000. The business and residential life of London has also been in part uprooted and again to some extent replanted. Nevertheless, after making all discounts, the resilience of London in health and spirit, despite aerial bombardment in the

1 *London County Council. Interim Report of the County Medical Officer of Health and School Medical Officer for the Year 1941.* Westminster: P. S. King and Staples, Ltd. (6d.: post free 7d.)

earlier months of 1941, transport difficulties all the time, black-out, restrictions on amenities, shortage of certain popular articles of food, and the strain and anxiety of war as well as its petty exasperations, is not merely a thing to wonder at but a subject worthy of the serious consideration of students of social science. The streak of heroism appears again and again in Dr. Allen Daley's routine record of health services. During the year 26 members of the staff of the health department lost their lives at the post of duty, and 95 were injured by enemy action. A woman medical officer and a man ambulance driver gained the George Medal, and awards and commendations for gallantry were made to 9 other members of the staff, 7 of them women. Special mention is made of the Council's midwives, who never left a call unanswered, and cheerfully carried out their duties in exacting circumstances, often delivering their patients while bombs were falling. The ambulance service manifested its usual initiative, pluck, and efficiency. As for the hospitals, if a hospital was partly or wholly put out of action patients and staff were promptly transferred elsewhere. The work of the health services was never disorganized.

RESUSCITATION FROM ASPHYXIA

In experiments on dogs G. L. Birnbaum and S. A. Thompson[1] of New York have pointed out that in advanced asphyxia—produced by inhalation of pure helium or nitrogen, or by tracheal obstruction—temporary resuscitation can be effected, after respiration has ceased and the circulation is rapidly failing, by rhythmic inflation of and suction on the lung with the inert gas (nitrogen or helium); this is termed asphyxial resuscitation, and as a result the animal may be kept alive for 1 to 3 minutes longer without oxygen or air. For this mechanical resuscitation they employed the Emerson resuscitator, which inflates the lungs to 14 mm. of mercury pressure and aspirates to −9 mm. The apparatus was usually regulated to make 16 to 20 complete excursions or respiratory strokes per minute and was connected with the face-mask or intratracheal tube. Birnbaum and Thompson find that the mechanism of this asphyxial resuscitation is primarily a reflex phenomenon which is initiated most efficiently by suck-and-blow resuscitation within safe limits of pressure. This temporary resuscitation with inert gas can be accomplished by suck and blow with the Emerson apparatus, arranged as described above, in 85% of instances, if the resuscitation is started within periods of 45 seconds to 2½ minutes after cessation of respiration. On the other hand, similar resuscitation with the inert gas can be accomplished in only 15% to 20% of instances by one of the following methods: manual artificial respiration with nitrogen inhalation, rhythmic pressure with nitrogen at +12 to 14 mm. Hg, or rhythmic suction on the lung at 8 to 12 mm. Hg alternating with nitrogen inhalation. The main point is that for the best results both active suck and blow are necessary. Suction must be active, because with mere passive expiration action currents are not set up in the nerves involved, whereas with active suction they are. Thus with rhythmic inflation and suction a powerful reflex mechanism allows temporary resuscitation to take place in the experimental animals with the use of only inert gas—that is, without oxygen. The circulation recovers regularly before spontaneous respiration begins. The addition of 10% CO_2 to the inert gas inhibits this resuscitation, as do bilateral vagus section before asphyxia is started and, to a less extent, denervation of the carotid sinus. The reflexes concerned apparently arise not only in the vagal endings in the lungs and cardio-aortic region but also in the carotid sinus area, and travel by the corresponding afferent nerves to the medullary centres—vasomotor, cardiac, and respiratory. As a result of these animal experiments it is suggested that, clinically, in advanced asphyxia when the respiration has ceased, oxygen alone or oxygen plus carbon dioxide should be administered by the suck-and-blow type of resuscitation, within safe limits of pressure.

[1] *J. Amer. med. Ass.*, 1942, **118**, 1364; *Proc. Soc. exp. Biol.*, 1941, **48**, 203; *Surg. Gynec. Obstet.*, 1942, **75**, 79.

MAN AND HIS ENVIRONMENT

Mr. A. M. Carr-Saunders[1] has recently reminded us that we find it more attractive to think of mastering our surroundings than of mastering ourselves. The pioneer efforts of Galton in the latter direction were weakened by his conventional class-consciousness and lack of appreciation of social problems; still truer was this of some of his disciples. Consequently professional biologists stood rather aloof; and indeed, until the rediscovery of Mendel's work laid bare the mechanism of inheritance, eugenics could hardly claim to be a science. The obstacles in the way of making a genetic analysis of man are immense, but it will be seen that the results obtained so far do not clash seriously with Galton's intuitive conclusions. We must remember that inheritance merely means that offspring get their genes from their parents, while environment includes for man not only physical factors, as for all animals, but also the provision of opportunities for learning. The object of social organization is not standardization but the creation of conditions under which genetically unique individuals (which we all are) can best fulfil the promise that is in them. Unfortunately there is reason to suspect that the genetic material in any civilized society deteriorates slowly but almost certainly, for harmful mutations are preserved which would perish under cruder conditions. True, they are compensated for, but that is not cure, and their persistence must be injurious to the common stock. There are always some people of subnormal mind and physique who cannot hold their own in the circle in which they were brought up and who, therefore, tend to sink. The damage is enhanced by the inverse relation between social class and fertility, even though this is now on the wane except in the lowest group of all. In the other strata the average of intelligence does not vary greatly. But the danger of unfavourable mutations occurring and being encouraged to persist is insidious, for there is a not inconsiderable element in the population which by reason of inferior hereditary endowment cannot take advantage of a good environment. Carr-Saunders, in his interesting review of the biological basis of human nature, brings to his support J. B. S. Haldane.

[1] *The Biological Basis of Human Nature.* By A. M. Carr-Saunders, M.A. Hobhouse Memorial Lectures, No. 12. Oxford University Press. (2s.)

Mr. H. S. Souttar, Chairman of Council of the British Medical Association and chairman of the Central Medical War Committee, has been made chairman of a mission to report on the medical services for the armed Forces in India. Prof. R. M. F. Picken has been appointed acting Chairman of Council during Mr. Souttar's absence.

A Royal Medal of the Royal Society has been awarded to Dr. W. W. C. Topley, F.R.S., for his outstanding work on experimental epidemiology and immunology, and the Buchanan Medal to Sir Wilson Jameson for his distinguished administrative service to hygienic science and practice.

The next session of the General Medical Council will open on Tuesday, Nov. 24, at 10 a.m., when the President, Mr. H. L. Eason, will take the chair and deliver an address.

War Medicine Series

The paper printed below is based on a lecture which was one of a series recently given at the British Postgraduate Medical School, Hammersmith

FOOD POISONING

BY

Sir WILLIAM SAVAGE, M.D., B.Sc.

(*Concluded from p. 585*)

Epidemiological Features of Food Poisoning

The epidemiological features of food poisoning merit some attention. I have already mentioned the physical condition of the food. Seasonal prevalence is much higher in the summer, particularly so for Salmonella outbreaks and those of other living bacilli. The infectivity rate varies considerably, and, except in botulism, not all the people who have taken the food become poisoned. In an outbreak from a toxic staphylococcus less than half the people who have eaten a particular food may be attacked; with living Salmonella poisoning the proportion is usually much higher, but all consumers are not invariably affected. There is practically no case-to-case infectivity unless people are really dirty in their habits. The case mortality with living Salmonella is from 1 to 2%; with the toxin outbreaks it is practically *nil*; in botulism, however, it is 60 to 70%.

The nature of the food vehicle is important. In botulism it is something which has been maintained under anaerobic conditions and often kept under wrong conditions. Botulism can arise from home-canned foods because the heating has been inexact, but in modern practice it very rarely occurs with the commercially canned article. With Salmonella, the more food is manipulated the more it is apt to be a danger. Slightly manipulated food like ham does not cause so many cases, but when we come to much-manipulated foods like brawn, meat pies, or ice-cream, the liability is increased. Tables I have published show very clearly the association of food poisoning with human food handling.

In Salmonella poisoning the three cardinal symptoms—diarrhoea, vomiting, and abdominal pain—are almost invariably present. Others are rise of temperature, nausea, and cramps, but these vary. The clinical distinction between the different types is important. Botulism can be distinguished by its characteristic symptoms. The toxin type may be due to staphylococci or it may be due to toxins of other organisms. If it is the toxin type you can usually distinguish it at once. Most important is the very short incubation period, while usually the onset is acute. The symptoms may be severe, but they last only a short time and recovery is rapid. This follows from the fact that the sufferer is taking into the body with this food all the poison at once; none is manufactured in the body. Therefore it acts quickly and its onset is abrupt. Directly it has sufficiently irritated the stomach and intestine it begins to act. It does not last very long, and when the toxin is eliminated the patient gets better. On the other hand, with living Salmonella bacilli the position is different, since the bacilli multiply inside the body. The incubation period will be considerably longer than for the toxin type, the length in part depending upon the amount of preformed toxins introduced. The bacilli have to establish themselves in the duodenum or jejunum and to grow there and manufacture their toxins. There is a gradual dosing with toxins, and the malady lasts a good deal longer. If these considerations are kept in mind confusion between the different types is unlikely.

Investigating Cause of an Outbreak

Given an outbreak, what are the lines of action? I cannot go fully into the public health side, but we have to endeavour to find out certain things. No investigation is complete unless four things are ascertained. The first is the vehicle of spread; the second is the causal agent, such as toxin or Salmonella. But that does not end the matter. So many of the reports I read include those two points and then those who write them appear to think they have finished their job. There are two more things to know. One is the reservoir from which the organism passed to the vehicle; the other is the path by which the organism was conveyed to the vehicle from the reservoir. For example, with an outbreak of ice-cream poisoning due to *B. enteritidis*, the vehicle and organism are known. But we still have to ask how the Salmonella got into the ice-cream and from where. This may be from various sources, and when elicited we know the reservoir. As to the path, we may find that the ice-cream was put to cool in a chamber where there was evidence of rats; but that is rare. I have investigated hundreds of outbreaks, and in a great many I have not been able to prove every one of these four things, but in each instance I have sought for all of them.

The ascertainment of the vehicle is sometimes easy, sometimes difficult. It is necessary to inquire what was eaten by all the persons concerned. In a recent ice-cream outbreak of mine associated with the Sonne dysentery bacillus it was easy. There were two ice-cream vendors at a little country fair; one sold his wares inside and the other outside, and all the people who had the illness had bought their ice-cream from the man inside, while none of those who had bought it from the man outside were ill. Then I found that this inside man had a regular itinerary and that wherever he stopped to sell his ice-cream there were sporadic cases of ice-cream poisoning.

In making an investigation leading questions must be avoided. Do not jump to a conclusion and say, "Did you eat that?" All the people must be asked in turn what they ate, and this inquiry may point to one particular item. It is quite useful to have a typed list of all the foods available at the peccant meal and ask every person who took part (whether sufferer or not) to tick each article eaten. I have had occasions when cases have occurred after banquets or parties, and it was discovered that the remnants of the food went to somebody else. If there is illness among those to whom particular foods were afterwards distributed that may clinch the matter. These ancillary inquiries are often exceedingly valuable in defining the vehicle at fault.

As regards the reservoir, that is a public health question. A large number of animals suffer from Salmonella diseases. These include most animals and many birds, but sheep very rarely. Rats and mice commonly suffer from these diseases, while ducks are susceptible. There have been a number of outbreaks in which ducks' eggs were concerned. When a custard seems to be the source of the trouble it is well to find out whether it was made from ducks' eggs. One has nearly always to look for an *animal* reservoir. In rats waves of Salmonella infections may occur and the bacilli may persist for long periods in the survivors. I have examined numbers of rats in slaughterhouses and have found a certain proportion harbouring Salmonella bacilli.

In a large proportion of outbreaks the investigator seeking the reservoir concentrates upon looking for a human carrier—a vain quest, for in general we do not get food poisoning from human carriers. The Salmonella organisms are gastro-intestinal irritants; they do not invade the body at all. An examination of the blood in cases always fails to show Salmonella bacilli. In other words, the Salmonella organism in food-poisoning outbreaks acts as a local organism. It stays in the gastro-intestinal tract (unless the patient dies) until it is washed out—quite different from *paratyphosus* B, which does not cause food poisoning but which does invade the blood stream. The ordinary food-poisoning types are local and it is a waste of time to look for a chronic human carrier. The human carrier is only seen as a hangover from an outbreak a few weeks earlier, before the bacilli have had time to be eliminated.

When confronted with an outbreak how should one deal with it? The first thing is to try to ascertain how many were ill, the magnitude of the outbreak, and the kind of symptoms from which the victims were suffering. This should be done roughly and not in full detail at the onset. The next point is to discover whether the outbreak is associated with a living bacillus, is a toxin outbreak, or is a botulinus outbreak. The symptoms and the incubation period will probably tell you right away what you are likely to be up against.

The next step is to ascertain the vehicle by inquiry and, if it is still operating, to stop its use. Sometimes it is most difficult to discover the vehicle, but do not leave it all to the bacteriologist to find it, for this is really an epidemiological job. It is unfair to collect samples of all the foods eaten and expect the bacteriologist to find the infected food. That may be necessary, but, done indiscriminately, is a waste of time. Having ascertained what is the vehicle, try to collect some of it for examination. Here some ingenuity must be employed. What are wanted are scraps left over from the food eaten. I have been able to isolate Salmonella from a tin thrown in the dustbin with a little food at the bottom of it. Do not be satisfied with a statement that the food has all been eaten. That is often not the case, and with persistence scraps of it may be found.

It is then important to go at once to the place where the food was made. In many outbreaks the investigator takes a lot of time collecting particulars of the cases and on the following day goes down to the shop where the meat pies or whatever is implicated were sold and reports everything beautifully clean. The shopkeeper is not a fool, and having heard of the matter everything is cleaned up. When you have knowledge of an outbreak go to the place of preparation (if there is one) *at once*, and then you are likely to find everyday conditions, including possibly a lack of cleanliness, remains of rats and mice about, and the like. A detailed inquiry elicits all sorts of things, while investigation should be made as to the habits of the staff regarding cleanliness. You may want to collect from the shop some of the food for the bacteriologist. Particular attention should be given to the way the food is cooled. A number of outbreaks have been caused by preparations like brawn, which are infected after being put out to cool. The slow cooling, perhaps for over twelve hours, enables specific infection to be enormously multiplied. I have known cases in which brawn was cooled by being put out on cellar steps. An examination should be made for all voided material suggesting rat and mouse infection.

The materials to send to the bacteriologist at once are the suspected foods, specimens of the vomit or faeces, and, in the case of death, post-mortem material. When there is death it is generally pretty easy to prove the nature of the infection. In many toxin outbreaks the bacteriologist finds nothing. If the outbreak is due to a staphylococcus which produces toxin, staphylococci will be found in the food, and one may expect to get the toxin; but in cases due to Salmonella toxins, with no bacilli present, nothing definite will be found. The diagnosis has to be made on the clinical symptoms and other facts. It is of no use sampling the blood in the acute cases for living bacilli. After a week from the onset blood for agglutination tests is most valuable.

With regard to prevention one has to find the cause and stop the vehicle. While case-to-case infectivity is low, nobody who is recovering should handle food until the stools are free from bacilli. In some recorded outbreaks the bacilli have persisted in the stools for a number of weeks.

CHRONIC SOURCES OF VENEREAL INFECTION

POWER TO ENFORCE TREATMENT

The following notes on Defence Regulation 33B have been supplied for publication by the Ministry of Health:

A new Defence Regulation 33B has been made which extends the powers available under the present law for the treatment of venereal diseases and enables compulsion to be applied in certain carefully defined circumstances.

Hitherto the arrangements for the treatment of these diseases in this country have been based exclusively on voluntary attendance for treatment, in contrast with the compulsory basis adopted in most other countries. The voluntary system has met with a large measure of success, and before the war the rate of incidence was low and compared favourably with the record of other countries. The new Regulation leaves the voluntary basis unchanged, but provides for compulsion, where necessary, to bring under treatment the group of persons—small in numbers, but responsible for a comparatively large amount of harm—who are impervious to methods of education and persuasion and who refuse to attend voluntarily for treatment although known to be infected and to be spreading infection.

In outline the Regulation provides that persons named by two separate patients under treatment as the suspected source of their infection can be required, by notice served on them by the medical officer of health of the county or county borough in which they live, to attend for examination and if necessary treatment by a "special practitioner," and to continue treatment in accordance with his directions until they are certified as free from venereal disease in a communicable form. A special practitioner is defined as a registered medical practitioner employed as, or qualified to act as, a venereal diseases officer of a treatment centre; or a specialist in venereal diseases in His Majesty's Forces or the Dominions Forces; or any other practitioner designated for the purpose by the Minister of Health.

The Regulation imposes on "special practitioners," on receiving information from a patient under treatment for venereal disease as to the person from whom the patient suspects that the disease was contracted ("the contact"), the duty of sending particulars in a prescribed form to the medical officer of health of the county or county borough in which the contact is believed to live. These particulars must be sent in each case unless, having regard to the information before him, the practitioner is of opinion that there is no reasonable cause to believe that the disease was in fact contracted from the person suspected. All information obtained is of course to be treated as strictly confidential.

A special practitioner is also required to supply free of charge any necessary certificates, and to serve on the contact (if found on examination to be suffering from venereal disease) a notice requiring attendance for treatment in accordance with his directions. The Minister has given certain general directions to special practitioners, as well as prescribing certain forms, and has compiled notes for their guidance. Copies of all these may be obtained from the Secretary, Ministry of Health, Whitehall, London, S.W.1, or from the medical officer of health of any county or county borough.

A special practitioner in private practice is under no obligation to undertake the examination or treatment as a private patient of a contact on whom a notice has been served by a medical officer of health; but if he does accept the contact as a private patient he must discharge the duties laid down in the Regulation. Any practitioner not otherwise qualified as a special practitioner who wishes to be designated as a special practitioner for the purposes of the Regulation should apply in the first instance to the medical officer of health of the county or county borough in which he practises, giving particulars of his experience in the treatment of venereal diseases.

Correspondence

Child Health

SIR,—Capt. Eric Townsend's letter (Nov. 7, p. 558) is excellent, for it goes to the very root of the matter. Child welfare clinics will never be any better until they are managed by those who have had a thorough training in diseases of infancy and childhood, including infant feeding and management. Those attached to a public health department are seldom, if ever, possessed of such knowledge. It has recently been decreed by the G.M.C. that this subject shall be taught clinically without the very necessary background of a systematic course of lectures. This, in my opinion, is a grave mistake. I have been teaching this subject for many years, and my experience is that young practitioners who have only attended a clinic know very little about infants and children or their diseases. It is essential that students should be compelled to attend a systematic course of lectures on this important subject. Unfortunately, the powers that be seem to have disregarded this either owing to ignorance or error on their part.—I am, etc.,

Edinburgh. JAMES BURNET.

Service Cases of Venereal Disease on Demobilization

SIR,—Post-war reconstruction is being widely discussed at present, and it therefore seems opportune that plans should be considered for the problem of dealing with Service cases of venereal disease on demobilization. We must avoid a repetition of the situation at the end of the last war, when many incompletely treated cases of V.D. returned to civil life and too often sought no further treatment. Much of the tertiary syphilis encountered in the past decade appears to have resulted from early disease inadequately treated at that time. Further, the Services are constantly discovering

unsuspected cases of congenital syphilis in men in their twenties, and many of these can be attributed to the same premature cessation of treatment in their fathers.

Even if on demobilization incompletely treated Service patients are given adequate details of the treatment they have received and are advised to continue their course at a civilian clinic, it is probable that only a small percentage will actually do so in that reactionary period. We shall require an "Army of Occupation" when an armistice comes, and with modern treatment it would not be incompatible with the efficiency of such an Army if V.D. cases were retained in the Services until the full standard treatment had been completed to the satisfaction of the authorities. We might thus prevent a considerably increased incidence of tertiary and congenital syphilis in the next generation and avoid an epidemic of early syphilis in the immediate post-war period. The problem might well be discussed now so that suitable arrangements can be prepared in advance.—We are, etc.,

DAVID ERSKINE.
V. E. LLOYD.

Guy's Hospital, S.E.1.

Control of Venereal Diseases

SIR,—As a clinical (V.D.) medical officer may I be extended the courtesy of your *Journal* to express my thanks to Col. L. W. Harrison and Dr. P. W. Hamond for their well-timed letters (Oct. 31, p. 528) in regard to the correct use of sulphapyridine in the treatment of gonorrhoea. I need hardly say that I endorse their remarks to the full. The common practice of administering sulphapyridine in cases of definite or suspected urethritis without taking preliminary steps to establish a diagnosis is clinically unsound and may result in tragic sequelae. The ritual of prescribing such a drug in total disregard of methods which have proved universally effective in the vast majority of cases is far more serious a matter, and may have far-reaching and untold deleterious results. It is quite trying enough to have to deal with one's own cases of drug-resistance, but when they arrive "ready made" on the doorstep it is sufficient to test the patience of a Job.

May I add an appeal in regard to another clinical procedure which is equally frequent in my experience and causes no end of trouble—namely, that of applying any form of antiseptic to genital lesions which may or may not be manifestations of early syphilis until such time as that diagnosis has been definitely ruled out. Much valuable time in arriving at a diagnosis, and instituting treatment if necessary, will be saved if this simple regime of "masterly inactivity" is observed. Venereal diseases clinics are provided to deal with all suspects and/or sufferers from such diseases, and I would earnestly ask all practitioners to refer their cases direct without recourse to previous efforts relative to diagnosis or treatment. By adopting such a line of action I am confident that the health of the whole community, individually and collectively, would derive inestimable benefit.—I am, etc.,

W. GILLIES ANNAN.

Durham.

Sulphonamides for Gonorrhoea

SIR,—A few years ago Col. L. W. Harrison stated in the *B.M.J.* that "it is better to wait until the attack [of gonorrhoea] has lasted 3 weeks before starting treatment with any of the remedies [i.e., sulphonamides]." Now he says that "sulphathiazole eradicates the disease in 2 days in 90% of cases." This too optimistic statement cannot be allowed to go unchallenged.

If the patient presents himself within 4 days after coitus—just as the inflammation is beginning to show itself in the mouth of the urethra—sulphathiazole would work the above wonder. But the same result has been obtained in the past by injecting 20% argyrol 3 times a day and sealing the urethra up by pressure for 15 minutes. The patient now, as before, asks for treatment when the discharge is fully established and thick pus is pouring out of the urethra. To expect sulphathiazole to cure this case in 4 days is to expect a miracle, and it never happens.

For successful treatment all patients (especially soldiers) should be put on the sick list for 2 weeks and ordered to irrigate with a bulbous-end glass syringe 3 times a day, using permanganate solution 1 in 4,000. I have found the big douche-can quite unnecessary and even harmful in acute cases. Sod. sulphathiazole 1 gramme every 4 hours (during day and night) should be given to the robust and every 6 hours to the others for 4 days.

The disappearance of gonococci from the urethral smear or from a centrifugalized specimen of urine after prostatic massage is not a proof that gonorrhoea has been eradicated. So long as pus cells and threads are present the case should be treated as infectious. There has been a great increase recently in the number of young women suffering from vaginitis of non-specific origin. Is it not possible that men who have got rid of their gonococci by taking sulphathiazole for 4 days have introduced other organisms into healthy vaginae and caused the above condition? To cure a woman of vaginitis is not a matter of days but weeks and months. No woman is ever cured by douching at home, inserting pessaries, and taking sulphathiazole or sulphapyridine by the mouth.—I am, etc.,

M. R. SONI.

Withington, Manchester.

Vitamin C and Resistance to Infection

SIR,—In reference to your annotation (Oct. 31, p. 518), I think that it is important to emphasize the other side of the picture. The boys in this institution were crowded together into badly ventilated dormitories and exposed to a virulent haemolytic streptococcal infection. Yet many of them achieved a high degree of immunity without ever falling ill, smoothly and silently, in spite of an intake of only 10 to 15 mg. of vitamin C daily (Thomson and Glazebrook, *J. Hyg.*, Camb., 1941, **41**, 570).

There is, of course, a wide variation in the susceptibility to hypovitaminosis C among individuals, and conclusions drawn from experiments on individuals are not of much value. This variation in susceptibility extends to tissues too, so that scurvy may first show itself as a gingivitis or an anaemia; while both conditions are commonly absent in frank scurvy, in my experience. One reason for these varying clinical pictures, besides local tissue susceptibility, is that additional factors are usually required to precipitate illness in latent scurvy. The factor may be, for instance, a suboptimal intake of iron or of the anti-pernicious anaemia factor insufficient in itself to cause an anaemia. In the presence of vitamin C deficiency the interplay of factors produces a hypochromic or hyperchromic picture, curable in either case by vitamin C. Thus, scorbutic gingivitis may be regarded not so much as a manifestation of scurvy but as a gum reaction to toxins or local infection in the presence of vitamin C deficiency. The gums will heal when treatment is directed to whichever of these factors is predominant. As an example, 300 cases of gingivitis in adults whose intake of vitamin C was low were examined. All showed evidence of varying degrees of vitamin C deficiency. 27 refused to heal until local treatment was stopped and vitamin C given. The remainder healed quite well with local treatment only. It is probable that vitamin C would have accelerated healing in these cases, but the planning of the experiment did not allow of this.

It seems that vitamin C plays a relatively minor though essential part in resistance to generalized infections, just as it plays a minor though essential part in haematopoiesis or in the maintenance of healthy gum tissue. Many boys aged 16 can lead healthy lives on an intake not exceeding 15 mg. daily. Their existence is a precarious one, however, for once a serious breach is made in their defences the tissue reactions are inadequate and their attempts at repair clumsy and laborious.—I am, etc.,

A. J. GLAZEBROOK.

Royal Infirmary, Edinburgh.

*** We apologize to Dr. Glazebrook for misspelling his name in our recent annotation.—ED., *B.M.J.*

Prevention of Small-pox

SIR,—Dr. C. Killick Millard criticizes the mass revaccination method of combating the recent small-pox epidemic in Glasgow. It would be interesting to know, as he says, the total amount of time lost through revaccination and compare that, not with the time lost through immunization against diphtheria, but with the total amount of time lost through small-pox, including, of course, an estimate of the time lost through deaths.

He states that such a drive as has been practised in Glasgow inevitably gives rise to "scare." I have no inside knowledge about the late epidemic, but I know something about the

previous one when about 400,000 people were revaccinated. The "drive" was nearly a week behind the "scare" or, more correctly, "panic." After the epidemic had been smouldering for some time a rumour got about that there had been 50 new cases of small-pox over the week-end in my district. I believe that was the number for the whole of Glasgow. When I went to my consulting room on the Monday evening I found a crowd at the door and my waiting and consulting rooms packed. When I asked what was wrong, the answer was, "We want to be vaccinated." No one offered to pay. They all expected that the town would pay. When we rang up the M.O.H. he said he would let us know, but it was several days before he told us that we should be paid. In the meantime we had to note the names and addresses of those we vaccinated and the results. Thus every general practitioner became a public vaccinator in fact if not in name and freed the M.O.H. and his staff to attend to what Dr. Millard calls "really important matters." Personally, I think revaccination was the most important matter at this time.

The year after that epidemic there was another one with 500 cases. I was informed by the superintendent of the small-pox hospital that not one of these cases had been revaccinated. So that the 400,000 who were revaccinated had 100% immunity. Dr. Millard is not logical in stating that he has a profound belief in the utility of selected individual vaccination and yet objects to mass revaccination during an epidemic. To depend on following up contacts alone without revaccination seems like trying to empty a bucket with a sieve. For one contact that is known there are probably dozens that are not known. Here are some examples.

Coming home late one Saturday night I found three people waiting for me in the hall. The first, a man, said he had a rash on his arms. He had small-pox. The other two I revaccinated at once. That man had been to a football match and had travelled in several trams. How many contacts had he made during that day? A baby, 17 days old, I found suffering from small-pox. On inquiry I discovered that the grandmother, who had visited it every day, was not very well. I went and saw her and found she had just recovered from small-pox, but had been about all the time, going into shops, etc. I had heard of a woman who was going about with a shawl over her head and most of her face, and this was the woman. I wonder how many people got small-pox from her.—I am, etc.,

Birmingham ROBERT ANDERSON, M.D.

The Dysentery Carrier

SIR,—In England and Wales the annual notifications of dysentery have shown a marked upward tendency during the last seven years, and the figure for 1941 was considerably higher than in any year since the disease was made notifiable. The increase in recent years was apparent well before the war, and cannot, therefore, be ascribed to wartime conditions. It is probable that the increase is due in part to the fact that we are becoming more bacteriologically minded, but even so, a considerable number of dysentery cases are still not fully investigated and do not appear in the notification records.

Modern sanitation, pure water, and safe milk have largely abolished the menace of intestinal infectious diseases. How is it, then, that dysentery seems to be increasing? There can be only one answer. We know that the disease is kept alive by the presence of carriers and "missed" cases; and we know that if carriers observe scrupulous care, particularly in the hygiene of the toilet, they cease to be dangerous to others. Each case of dysentery probably means that somebody has been careless in personal hygiene, and an outbreak usually means that the person at fault is a food handler. The prevalence of dysentery may be taken as an index of the standard of personal hygiene in the community.

Two things are necessary—the provision of washing facilities and education of the public in the importance of their use. Legislation has now ensured the provision of washing facilities and soap and towels for food handlers, but only education can ensure their regular use. There is room for improvement in the standards of hygiene in the home, at the place of work, and in public places. Too often it is found that the conscientious citizen is penalized by having to pay the extra cost of a "wash and brush up."

It is not enough merely to teach the subject of hygiene in school classes. Good habits should be inculcated until they become second nature to the children. The public should not be permitted to retain the present universal belief that attacks of diarrhoea are the inevitable consequence of wartime food and conditions. Such complacency leads to an increase in the number of undiagnosed convalescent dysentery carriers. Publicity on intestinal infections and their relation to personal hygiene would not be easy, but it should be within the means of publicity experts to devise and propagate suitable material, even for this unattractive subject.—I am, etc.,

London, S.W.1. IAN TAYLOR.

Epidemic Hepatitis

SIR,—Earlier this year (April 11, p. 466) you published a short account by me of a series of cases of epidemic hepatitis that occurred in this district in September and October, 1941. The following report on the subsequent course of the disease may be of interest.

Onset of last case in the 1941 series, Oct. 22, 1941; onset of next case notified to M.O.H. in Jan., 1942. This first case in the present year was followed by a second case in the same family in February, and on April 10 a third member of the family developed icterus. There were two other cases in March and April, the dates of onset being March 17 (the child was a playmate of the family in which there were three cases) and April 18. These two children and the family of three all attended the same school, and two of the families were, as stated, close friends. All five children developed icterus after an illness with a coryzal onset.

At the other end of the town three cases occurred as follows: (1) onset of icterus March 15; (2) first symptoms April 1, icterus April 8; (3) first symptoms April 10, icterus April 15. All these patients lived near one another, attended the same school, and their illness began with abdominal symptoms. After this there was an interval of 4½ months before the next case was notified; in this the coryzal onset was on Aug. 27 and icterus appeared on Aug. 31. No further case has been notified up to the date of writing, Oct. 21.

It is unwise to draw conclusions from a small series of cases, but it would appear that the incubation period may well be one month—e.g., the family of three and their playmate developed icterus at intervals of one month. The disease is not notifiable, so that there may well have been other cases during the closing months of last year and during the summer of this year, or the infection may have been kept going in the district by subclinical cases, or the initial patient in any series may have contracted the infection outside the district. There are still many points for elucidation in this affection, and the collection and correlation of reports from as many sources as possible would be of service.—I am, etc.,

Mirfield, Yorks. C. GRANT NICOL.

Control of Malaria in Palestine

SIR,—In the leading article on the control of malaria in Palestine (Oct. 31, p. 517) it is stated: "Perhaps the most noticeable feature in respect to species is that *A. maculipennis*, which assumed such importance in Macedonia in the last war, does not occur." This is very far from being the case. *A. elutus*, the dangerous malaria vector in rural areas of Palestine, is one of the varieties, or races, of *A. maculipennis*. It is indeed the very variety that is responsible for most of the malaria in Macedonia. *A. maculipennis* var. *elutus* in Macedonia appears to have a more marked predilection for slightly saline breeding places than does its Palestinian prototype, but no other differences have, I think, been recorded.—I am, etc.,

Bicester. NORMAN WHITE.

*** As the passage referred to in Dr. Norman White's letter is evidently liable to give rise to some misconception a word of explanation is desirable. *A. elutus* Edw. (more correctly *A. sacharovi* Favr), though originally described as a species resembling but distinct from *A. maculipennis*, was for some time frequently treated by authorities as one of the five or six varieties of this species. It is now, however, generally considered and referred to as a species in its own right. That *A. elutus* was mentioned in the leading article among the three species playing an important part as carriers in rural areas in Palestine should have been an indication that it was so regarded both by the author of the report and by the reviewer. *A. maculipennis* in any of its varieties (if we except *elutus* as not being a variety but a distinct species) has never been

recorded from Palestine, an interesting fact in distribution which is repeated further east where in Iraq *A. maculipennis* is not encountered going north until at or beyond Mosul, although incidentally *A. elutus* has been recorded from Basra some hundreds of miles to the south.—ED., *B.M.J.*

Tetanus

SIR,—I was extremely interested in the article on this subject by Dr. Leslie Cole (Nov. 7, p. 550). I agree in general with his able article, but I should like to add a few points which I developed in treating a case a few years ago.

The patient was a gardener aged 52 and he developed tetanus after pricking his finger while at work. I kept him under continual avertin anaesthesia for 6 days, giving a full surgical dose per rectum every 12 hours during this period. I kept his lungs dry with atropine and sustained him with a rectal drip of saline and glucose. I gave no antitoxin as I believe that if the spasms can be controlled the body will produce its own antitoxin in due course. In my case the patient recovered in some 10 days' time and is alive and well to-day. I had some difficulty with breathing, but found that nasal doses of CO_2 from time to time restored respiratory rhythm.

As this disease is common on the battlefield, more attention will have to be given to it than in the past.—I am, etc.,

Weybridge. JOHN H. HANNAN, M.D.

First-aid for Fractured Spine

SIR,—My thirty years' experience as an industrial surgeon has shown me that fracture of the spine is a far less uncommon injury in the heavy industries than is usually appreciated. In the absence of repeated *x*-ray examinations cases are overlooked until later disabilities arise. An essential link in the chain of cure is a specially trained industrial first-aid team. It is important that the idea should be removed from the first-aider's mind that paralysis is a sign of a fracture of the spine. His duty is to recognize the simple fracture, and by his handling of the case to avoid the complication of cord damage.

Having to deal with large numbers of first-aiders and to face on the operating table and in the hospital ward the failures of my teaching, I evolved a method of handling these cases that proved most satisfactory and which the first-aiders learned without difficulty. I am strongly of the opinion that fractures of the thoracic and lumbar spine must be transported face downwards with a firm pad—e.g., rolled-up blanket—immediately below the clavicle and immediately above the knees. The method of turning the patient on to his side, and the stretcher on to its edge to meet him, I found not only unsatisfactory but dangerous.

I shall be pleased to supply any of my colleagues who may be interested with details of my method of turning, lifting, and carrying cases of fracture of the cervical and of the lumbo-thoracic spine. I fear it would occupy more space in the *Journal* than in wartime the Editor can spare.—I am, etc.,

THOMAS E. A. STOWELL, F.R.C.S.,
Chairman, Advisory Medical Committee, Industrial Welfare Society.

14, Hobart Place, Westminster, S.W.1.

Shock Treatment in Psychiatry

SIR,—Your admirably balanced assessment of the new methods for the physical treatment of the psychoses (Oct. 3, p. 397) is welcome. It required to be more widely known that much can be done for the early schizophrenic with insulin and for the depressive with convulsion treatment, and that convulsion is not a promising treatment for schizophrenia. Furthermore, it has been made clear why, in the face of better knowledge, convulsion has been so extensively applied to schizophrenics to the neglect of insulin, and that the prospects offered by the latter are favourable enough to make an acute treatment centre a communally profitable enterprise.

For want of facilities most early schizophrenics—i.e., those sent to public mental hospitals—cannot be given insulin (there are a few exceptions), and only a few can avail themselves of the facilities offered by some private and registered institutions. I fail to see the logic of Dr. K. A. Graf's argument that it would be difficult to get in touch with the early cases, since most public mental hospitals run independent villas and clinics for this very purpose, only they simply have not the staff and the time to undertake the far more exacting insulin treatment.

I trust your statement that "for the early schizophrenic . . . this latter use [convulsion] instead of insulin is, except in the rarest cases, really disastrous" may not be misread as implying that rather than give the early schizophrenic convulsion in default of insulin, convulsion should be withheld from him altogether. No one, however much convinced of the merits of insulin, would wish to see that happen, and, until your scheme has been put into operation, we shall have to cut our coat according to our cloth. I write as one responsible for the introduction of insulin shock treatment into this country, and have always regretted the tendency to regard convulsion as a cure-all (Dec. 31, 1938, p. 1390). I have seen, however, what can be done with convulsion even in schizophrenics, provided it is combined with sustained psychotherapeutic encouragement as taught by Meduna. Pioneers see a great deal of their patients between treatments, but once the method has become popular patients are more and more left to themselves between treatments. The latter does not so much apply to insulin, where the physician willy-nilly has to be with his patients 5 hours each day during several months, but it certainly applies to convulsion; as far as this goes, the universal introduction of foolproof electrical apparatus is to be regretted, and only recently FitzGerald and Saul (June 13, p. 736) said they saw it coming when the house-surgeon would be left "to press the button." Also, your observation, all too true, that results obtained by haphazard playing around with insulin and convulsion cannot be compared with those obtained by system and planning applies even more to convulsion, where judicious spacing of the fits may make a great deal of difference, and where results are more liable to be frittered away by want of persistence and perseverance.

I trust that these remarks will not be misunderstood: the aim is to provide insulin for the early schizophrenic throughout the country, but until then we shall have to get the best out of convulsion.—I am, etc.,

Falmouth. H. PULLAR-STRECKER.

Dressing for Thiersch Grafts

SIR,—The late Sir Henry M. Gray, who gave so many good things to the profession, used to leave his skin grafts bare whenever possible. This allows one to snip any blebs that form. The atmosphere under the cradle should be kept moist. One can generally tell if a take is probable before the patient leaves the table. The old "Worth's patent buff strop"—now, I fear, unobtainable—gives such a splendid edge to a razor that anyone with a little practice can cut large sheets of graft. These, when left alone by Gray's method, give the best results I have seen; but I can recall cases in which pressure by sponge rubber might have prevented a loss of the graft. It is often found that the basal cells have taken in this type of case.—I am, etc.,

London, W.1. G. H. COLT.

Aortic Regurgitation and Mitral Stenosis

SIR,—In his paper (Oct. 24, p. 473) on some aspects of carditis Dr. T. F. Cotton states that out of 194 cases of valvular disease 38 had aortic regurgitation and mitral stenosis. Surely some of these must have been cases of aortic regurgitation with Flint's murmur and no mitral stenosis. In 1862 Austin Flint first pointed out that when a presystolic murmur was heard in aortic regurgitation, only a small proportion of cases had mitral stenosis. In 1901 Thayer, at the Johns Hopkins Hospital, found that "in 45 post-mortems of cases of aortic regurgitation with a presystolic murmur only 12 had any mitral stenosis, and in these the pulse was noted as not large, and in most of them there was a loud snapping first sound at the apex."

Mitral stenosis would be incompatible with life if there was much aortic regurgitation; blood would never get through a stenosed mitral orifice against the pressure in the left ventricle; and, where the pulse is large and collapsing, no mitral stenosis is found post mortem. The probable explanation is that the regurgitant stream from the aorta strikes against the anterior flap of the mitral valve and causes vibrations in it, which produce the presystolic murmur and thrill.—I am, etc.,

Hove. WALTER BROADBENT, M.D., F.R.C.P.

Tonsillectomy: Guillotine or Dissection?

SIR,—Mr. T. B. Jobson, in his article on tonsillectomy by guillotine and dissection, seems anxious to revive a controversy which by now must surely be on its last legs. What a pity to delay the guillotine on its journey to the scrap-metal campaign. What good can come of its reintroduction now? Mr. Jobson has a lot to say against it, but the implication of his article is that he uses it extensively himself, and would probably have other people do the same. He gives a list of reasons why satisfactory results are not obtained from its use, but the concluding note, together with his golfing analogy, implies that all its disadvantages can be successfully overcome by the expert after some hundreds or thousands of practice shots.

There is a most impressive silence in the article on the treatment of adenoids in the guillotine method. It is now universally recognized that complete removal of adenoids in children is in every way as important as the complete removal of tonsils. Who, having watched the guillotine method of tonsillectomy, with its hurried manipulations terminating in a rising tide of blood, could believe that the stage is now ideally set for the removal of the adenoids? The lightly anaesthetized patient is turned over, and against a tightening barrier of resistant palatine muscle the curette is forced into the nasopharynx and blindly swept over its posterior wall. The tonsils may have gone completely, but there is many a pad of adenoid tissue which escapes that cramped unseeing sweep and lives to infect on another day.

At the Hospital for Sick Children, Great Ormond Street, where tonsil dissection has been employed exclusively since Mr. Waugh's campaign in 1909, the registrars are carefully instructed to take as much time as necessary to perform a completely satisfactory operation when removing the adenoids. This involves a digital examination of the posterior nasopharynx in the *fully anaesthetized* patient, followed by a careful curetting of the posterior wall with a sharp curette, first in the midline and then a sweep on either side around the Eustachian cushions, and then another careful digital examination. Complete haemostasis is secured before the anaesthetic is stopped. All this can only be done if the soft palate is fully relaxed—that is to say, if the patient is fully anaesthetized and without any pharyngeal reflexes.

The adenoid tissue left behind in the guillotine method may be high up on the posterior nasopharyngeal wall or distributed on either side and overhanging the Eustachian openings. Often it hypertrophies, and, becoming infected, causes chronic sinusitis, post-nasal catarrh, Eustachian blockage, catarrhal deafness, and is the focus of infection of the neighbouring lymphatic tissue. Removal of such offending tissue was a frequent operation at Great Ormond Street, where the patient reported after a successful tonsillectomy elsewhere but still suffered the old symptoms on account of retained infected adenoid tissue. Such cases can be seen again and again at E.N.T. hospitals. The guillotine operation as practised by the majority of its exponents does not give the necessary time, the sight, or the necessary palatine relaxation for dealing with the adenoids as an important and separate problem. The adenoids become a concluding gesture in a welter of blood and confusion.

No doubt in the hands of men like Sluder results of tonsil guillotining rise to 99.6% success, but what of the unfortunate cases dealt with by the professor in his early days? Mr. Jobson points out that the guillotine takes immense experience to handle really successfully and to produce results comparable with dissection. It would seem, therefore, that whereas great numbers of patients must have unsatisfactory operations at the hands of student "guillotineers," it would not be so in dissection, where the student has plenty of time to note and correct his errors and have his professor's criticism in time for it to be of use to the patient.

Finally, it is interesting to note that Sir StClair Thomson quotes tonsil dissection as being one of the oldest operations in the world, as Celsus (53 B.C.) wrote that "tonsils that are indurated should be disengaged all round by the finger and then pulled out." Few operative techniques can have such a worthy recommendation. It would be interesting to know whether there still exists a Celsus gag and tonsil-holding forceps listed among the instrumental monuments to be found in any current catalogue of ear, nose and throat instruments.—I am, etc.,

St. Ives, Cornwall. E. C. ATKINSON.

Working for a Salary

SIR,—The relative value of work done by salaried officers and by non-salaried medical workers is being increasingly discussed at the present time, generally with little regard to any factor other than the prejudices of individual writers. My own views may be properly subject to the same criticism, but I venture to point out two aspects of the matter which are commonly overlooked, and which were, I think, misrepresented by implication in Dr. Una Westell's letter (Nov. 7, p. 561).

Where a doctor is not in receipt of a fixed salary there is a very strong inducement (even if it is entirely unconscious) to consider the financial return of any course of professional action: the economic factor must essentially be pronounced. The worker for a fixed salary, on the other hand, is entirely free from considerations of financial competition, but so far from lacking stimulus in his work he has that much more energy liberated for the performance of his duties, and is stimulated by other forms of the competitive urge to vie with his colleagues in efficiency and to achieve minor fame as a successful exponent of his particular branch of medical work.

The most complete answer to any claims that a fixed salary leads to an unprogressive spirit is surely afforded by the fact that almost all prominent research workers are salaried officers of universities, yet they, more than any other branch of the medical profession, contribute to real scientific progress.—I am, etc.,

Weston-super-Mare. CYRIL G. EASTWOOD, Medical Officer of Health.

Medical Officers of Health: A Recent Circular

SIR,—I should be very interested to hear the views of your readers, especially those who, like myself, hold positions under local authorities and whose interests are, therefore, primarily affected, on the meanings and implications of a circular letter which I, in common with my colleagues, have received from my chief.

The circular states that the council have, as a wartime measure, decided that the normal hours of work for the professional, administrative, and clerical staffs shall be fixed at a minimum of 39 hours a week (exclusive of the midday break). It further states that the council have also decided that any *authorized* overtime above the 39 hours shall be paid for as set out in the South Metropolitan District Council's recommendations, which are as follows: (1) to restrict the annual leave of all officers to two weeks; (2) to approve such increase as may be necessary in the working hours of officers, subject to the payment of overtime therefor.

These recommendations are subject to the following conditions:

1. Annual leave may be taken in one period of two weeks or in broken periods as the local authority may determine.
2. For the purpose of assessing overtime payable the "normal" working hours shall be assumed to be 39 a week (exclusive of the midday break), and the difference between such working hours and the wartime working hours shall be paid for at plain time rates of salary (exclusive of war bonus).
3. Hours worked over 46 and up to 52 per week (exclusive of meal-time breaks) shall be paid for at one and a quarter plain time rates of salary, and one and a half plain time rates of salary for hours over 52 (exclusive of war bonus).
4. Officers (male and female) with a basic salary exceeding £500 per annum shall not be eligible for the payment provided in (2) and (3) above, provided that an officer whose salary (excluding bonus) exceeds £500 per annum shall not receive less than any officer who is entitled to the payment provided in (2) above.

After enumerating 5 further conditions the circular proceeds:

10. No officer shall be adversely affected by reason of the application of these recommendations.
11. Any question arising between a local authority and its staff regarding the interpretation of these recommendations or any anomalies arising as a result of the operation thereof shall be determined in the first place by local negotiations or, failing agreement, by the District Council for the area, or, failing agreement, by the National Council.

The above, Sir, are what seem to me to be the essential parts of this circular. Many points spring to my mind in regard to the provisos contained therein. Here are a few:

1. The circular obviously applies to medical staffs (among others) working under local authorities. Most of these medical officers have

definite agreements with their local authorities, but, so far as I am aware, they have not been consulted on whether they would agree to the provisos contained in the circular, one of which, for instance, alters the conditions of service in regard to annual leave which in most agreements is fixed at four weeks for every eleven months' service.

2. Many of the medical personnel of public health departments have consistently for years worked much more than the 52 hours a week mentioned in the circular. Of these, some, such as resident medical officers in municipal hospitals, whose rate of remuneration is, say, £300 per annum with emoluments valued at £140 per annum, will qualify for the payment of overtime at what would appear at first sight to be a very handsome figure. Other, and more senior, officers, who by reason of their greater responsibilities or longer service receive a salary of £500 or over, are particularly excluded from participation in the proposed award for working overtime, but are nevertheless included in the provision which curtails their annual leave by 50%. Why senior officers doing more responsible work should suffer from this discriminatory treatment is not clear, unless the reason lies in the large sums of overtime pay which they might earn. To take my own case, for instance, I am in charge of an important subdepartment, and, apart from my four-weeks annual leave, am on call and therefore on duty for the whole 24 hours every day of the week, Sundays included. Clause 4 of the conditions set out above, however, debars me from any participation in overtime benefits, but permits my assistants to benefit as their salaries are below the figure of £500 per annum. It seems a curious state of affairs.

Could anyone enlighten me as to the identity and powers of the South Metropolitan District Council and the National Council, of whose existence I have been up to now completely ignorant? None of my colleagues to whom I have spoken appears to know any more than I do. Have the members of the National Council, whoever they may be, the right to make such recommendations as the above in regard to the conditions of service of medical practitioners without affording such practitioners the opportunity to discuss, agree, or disagree with any or the whole of such recommendations?

The views and comments of your readers will be much appreciated, and for obvious reasons I sign myself,

A.M.O.H.

Rehabilitation Centres

SIR,—I am sure Mr. G. R. Girdlestone's letter and the memorandum from the British Orthopaedic Association on the question of rehabilitation centres (Oct. 31, p. 526) will be read with interest.

The letter assumes that rehabilitation is a water-tight method of therapy which concerns wounds and accidents, and extension of this service under the same administrative and surgical control is advised. Rehabilitation is, in truth, a method of treatment which concerns disease as importantly as injury. For instance, it is of the greatest interest and importance to the neurologist and to the general physician, more especially to those interested in the chronic rheumatic diseases. It would be a retrograde step if rehabilitation centres were placed under surgical control, for the viewpoint would be narrowed, and the best use would not be made of these centres. Recognition that rehabilitation is a matter which concerns the physician as much as, or more than, the surgeon would be a forward step with great possibilities both now and in time to come.—I am, etc.,

London, W.1. ERNEST FLETCHER.

Hyperostosis Frontalis Interna

SIR,—I read with great interest Dr. C. T. Andrews's article (Aug. 15, p. 185). It is an interesting subject, especially if one considers that practically women only are affected by it and men only by leontiasis ossea. It seems to me that its occurrence must be connected with the endocrines and conditioned by them, as it appears that the same glandular fault will lead to the one in men and at certain periods (pregnancy, menopause) to the other in women; or is hyperostosis frontalis interna in women merely an arrested form of leontiasis ossea?

The case observed by me between 1935 and 1941 was in a woman aged 47, who in 1918 after her second pregnancy developed severe right frontal headache, which never left her. Four months after the confinement she had her first epileptic fit (grand mal). Since then she has had 3 to 4 fits yearly, most of them at night with incontinence of bladder, etc., and since 1934 these fits could be controlled by phenobarbitone, 1 or 2 gr., but never the headache. There is no epilepsy in her family nor any other familial disease. Her periods were regular and normal until 1940, when she was operated on for carcinoma of the left ovary. In 1935 she underwent cholecystectomy for chronic cholecystitis without gall-stones, and appendicectomy.

When first seen in June, 1935, clinically nothing abnormal was found, but the liver was felt and there was slight venous congestion over the right forehead. B.P. 120/65. Urine: albumin, sugar, urobilinogen, and porphyrin negative; sp. gr. 1013. There was frequency by day and night. Blood count: Hb 88%; R.B.C., 2,640,000; W.B.C., 7,600—eosinophils 2%, monocytes 7%, lymphocytes 32%, polymorphs 59%; poikilocytosis; microcytes and megalocytes were found but no megaloblasts or normoblasts. Wassermann reaction negative. Radiograph: hyperostosis of both frontal bones; pineal gland calcified; fundi normal; small bilateral central scotoma. C.S.F. and ventriculogram normal. Electro-encephalogram: small right frontal delta focus involving nearly the whole of the upper and frontal region.

There was prompt reaction to liver treatment, but no remission of the pernicious anaemia has been observed. Mental condition: not dependent on her general condition; easily depressed, easily paranoic, at times very dull, almost demented, only at rare intervals fit for her own home duties, always fatigued, and sleeps on an average 16 hours. Besides those epileptic fits, narcoleptic fits come on at irregular times after due warning.

This case of hyperostosis frontalis interna is of special interest as it is complicated by pernicious anaemia. Or is the same glandular or hypothalamic disorder responsible for both? In this connexion one is certainly reminded of those still rarer diseases Cooley's and Jackson's anaemia, both of which show skull changes in radiographs. Dr. Andrews is to be congratulated on his successful treatment with benzedrine. But, more important still, as he shows, the condition must be recognized and appreciated in the differential diagnosis of headache associated with general indefinite symptoms.—I am, etc.,

LEO RAU, M.D., M.R.C.P.
Lieut., R.A.M.C.

A Supply of Trained Male Nurses

SIR,—My committee—an association run by naval medical officers to help in assisting sick-berth staff to find suitable employment on being discharged to pension—desires to draw attention to a source of supply of well-trained male nurses whose position appears to have been overlooked in the framing of the reports of the Athlone and Horder Committees.

Very shortly, it may be stated that naval sick-berth ratings are trained at the expense of the Admiralty, and efficiently carry out the sick nursing at Royal Naval hospitals, R.N. depots, and on H.M. ships. Their qualifications and Service examinations for promotion in no way fall short of the requirements for the certificate of the State-registered nurse. After at least twenty years' service they retire on pension, and those who wish to make use of their training find themselves unrecognized as possessing any nursing qualifications. A letter to this effect has been sent to the Minister of Health. Many medical men at present serving as temporary naval medical officers must have had experience and felt the advantages of having such reliable, capable, and experienced sick-berth ratings to assist them in the treatment of the sick and wounded.

My committee thinks that more consideration and recognition should be given to men who have served their country for at least twenty years at home and abroad and have been efficiently trained by giving them a definite status in any nursing Act that may come into force.—I am, etc.,

J. FALCONER HALL.
Surg. Rear-Admiral (ret.).
Hon. Secretary, Central Council, Royal Naval Sick Berth Staff Associations.

London, N.W.6.

G. L. Maltby and M. Rosenbaum (*Proc. Soc. exp. Biol.*, N.Y., 1942, **50**, 10) have made an electro-encephalographic study of 17 patients in whom a diagnosis of eclampsia was made because of convulsive seizures associated with the latter part of the puerperium, the patients being studied from one week to five years after their admission to hospital. The electro-encephalograms of 77% of these patients showed a cerebral dysrhythmia, and in 58% there was a family history of convulsive disorders. Maltby and Rosenbaum suggest that in patients with eclampsia there may be a primary cerebral dysrhythmia, and that the associated toxaemia may act as a trigger mechanism making manifest the convulsive tendency.

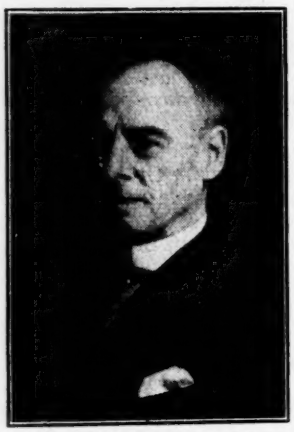
whether there still exists a Celsus gag and tonsil-holding forceps working under local authorities. Most of these medical officers have

Obituary

SIR NORMAN WALKER, M.D., F.R.C.P.ED.

We announced last week the death of Sir Norman Walker, formerly president of the General Medical Council, which took place on Nov. 7 at his home in Midlothian.

Norman Walker was born at Dysart in Fife in 1862. His father, the Rev. Dr. Norman Walker, was a well-known figure in the Free Church of Scotland for many years. The son was educated at the Edinburgh Academy and afterwards went on to the University. He graduated M.B., C.M. in 1884, and took the M.D. four years later. His first post was that of resident physician at Edinburgh Royal Infirmary in 1885. During the next five years he engaged in practice in England, though near the border, in Cumberland, and there he remained until 1890, in which year he was president of the Carlisle Medical Society. It was in Cumberland that he met his wife, Annie Trimble, whom he married in 1887, and by whom he had three sons and one daughter. One of the sons, Dr. E. R. C. Walker of Aberdeen—and now a prisoner of war—is well known in the Scottish and central affairs of the B.M.A.



[W. and E. Drummond Young, Edinburgh.

Returning to Edinburgh, Norman Walker built up a reputation as a dermatologist. He had already spent a great deal of time on the Continent, especially at Vienna and Prague, where his mind received its bent towards dermatology, in which he was to specialize for the remainder of his medical career. His appointment as assistant physician in dermatology at the Edinburgh Royal Infirmary began an unbroken connexion with that institution extending over half a century, during which he became physician to the skin department and in later years consulting physician. He was also lecturer at the University. During his visits to the Continent he had become a disciple of P. G. Unna of Hamburg, whose work, *The Histopathology of Diseases of the Skin*, he translated from the German in 1896. He accomplished his task with notable skill and a general avoidance of foreign idiom, although to translate some of the terms into English was almost an impossibility. He had, fortunately, the help of Unna himself, with whom he had been on intimate terms for some years, and Unna more than once acknowledged his good fortune in having so competent an English translator who had become familiar with his work during many visits to his clinic. It was not Walker's first essay in what may be called heavy translation. He had already translated from the Norwegian the work on *Leprosy in its Clinical and Pathological Aspects* by Hansen and Looft. In 1899 he published the first edition of his own *Introduction to Dermatology*. This was a work of 250 pages, a reproduction of lectures which he had been giving to his students in Edinburgh, but it found an appreciative public and ran into many editions, the tenth being published forty years after the first.

As time went on Norman Walker became more closely identified with the University and with academic affairs in Scotland. He had a natural aptitude for university administration. He became a member of the Court and a curator of patronage. He was also inspector of anatomy for Scotland. Of the Royal College of Physicians of Edinburgh, of which he became a Fellow in 1892, he was for many years treasurer and was elected President in 1929. He was a Corresponding Member of the American, French, and Danish Dermatological Societies, an Honorary Fellow of the American Medical Association, and an honorary member of the Association of Military Surgeons of the United States. In 1906 he was president of the Fife Medical Association. He also took a conspicuous part in the organization of medical services in Scotland. During the war of 1914-18 he was chairman and convener of the Scottish Medical Services Emergency Committee, and later chairman of the Consultative Council for Medical and Allied Services, Scottish Board of Health. Another organization in which he was interested was the Highlands and Islands Medical Service Board, established by Act of Parliament and constituted in 1913. The Board did its work very thoroughly; there was no part of the Highlands and Islands, however remote, which was not visited by more than one member, and Norman Walker was as assiduous as any. In the B.M.A. he was at one time active, and always interested and friendly, though his official position in the G.M.C. later on entailed a withdrawal from participation in Association affairs. He was chairman of the Science Committee of the Association in 1906.

The General Medical Council

Sir Norman Walker was elected a member of the General Medical Council as the direct representative for Scotland in 1907 and so remained for more than thirty years. Here he found work after his own heart. For many years before his election to the presidency in 1931 he was Chairman of Business, which means aide-de-camp to the president and whip of the Council. For about a quarter of a century he was a member of the Executive Committee, the Penal Cases Committee, the Examination Committee, the Business Committee, and the Pharmacopoeia Committee. He was also a most useful member of special committees dealing with such subjects as students' registration, the prevention of unqualified practice, and the National Health Insurance Act. On his retirement from the chair of the Council in 1939 his successor, Mr. Eason, said that there was no problem which came before them which he could not simplify by reason of his familiarity with precedent and tradition.

One of his most noteworthy achievements for the G.M.C. was his two visits to all the medical colleges and several of the numerous medical schools of India. His reports on his return and his great familiarity with the position of medical education in India enabled the Council to deal effectively with the delicate situation which arose in connexion with Indian universities and their medical degrees. It had come to the notice of the Council that there was a certain laxity in the conduct of examinations in India, and it was thought that the regulations which students in this country were required to follow were not being observed out there. Sir Norman Walker's first visit to India took place in 1922. He was asked to undertake this task by Mr. Edwin Montagu, then Secretary of State. In spite of great difficulties and some bitter feeling which he encountered, he had the satisfaction, in conference with the Indian Universities authorities, of having his recommendations accepted. His tact and judgment and his sincere desire to promote sound professional education in India were acknowledged, and a more satisfactory measure of agreement was brought about, especially as regards training in obstetrics, than had previously existed. Without his assistance and knowledge the Council might have taken a false step in a difficult situation. He enabled the Council to shape its policies to the ultimate benefit of medical education in India.

In 1931, when Sir Donald MacAlister closed his long presidency, Sir Norman Walker was his obvious successor. For many years he and Sir Donald had been in closest association and friendship. Lady MacAlister in her biography of her husband mentions Sir Norman as "tirelessly kind and helpful." It is a remarkable fact that the G.M.C. for almost half its history should have had these two Scotsmen at its head. During his eight years of office in the chair Sir Norman proved an able, businesslike president, though he had not the brilliant qualities of his predecessor. But he was invariably courteous, quietly dignified, and a mine of knowledge on the history and procedure of the Council.

He received the honour of knighthood in 1923, his name appearing in the India Office list in recognition of the success of his efforts in his visit to the Indian Universities the previous year. Among other distinctions which came to him were the honorary degrees of LL.D. of St. Andrews, Edinburgh, and Bristol, and M.D. of Dublin.

R. E. MOYES, M.D.

T. A. H. sends the following tribute supplementing the memoir published last week.

The public and the medical profession of the North of England are permanently impoverished by the sudden death of Dr. Robert Esmond Moyes. Born at Largs in 1884, where his father was a well-known and respected practitioner, Moyes took his M.B., Ch.B. at Edinburgh University in 1905 and the M.D. in 1910. Soon after qualification he went into general practice in Broomhill and remained there and in the Warkworth district during his professional life, except for two years during the last war, when he served as a captain in the R.A.M.C. in Mesopotamia and Palestine. After the war Moyes took a great interest in the British Medical Association, and was president of the North of England Branch in 1939. Up to the time of his death he was a member of the Medical Advisory Committee of the Ministry of Health. He was always very interested in the Northern Counties Medical Society and was president during the 1923-4 session. He was chairman of the Northumberland Insurance Committee, and during the present war chairman also of the Northumberland Medical Recruiting Board under the National Services (Armed Forces) Act, 1939. Whatever work Moyes undertook he did to the best of his ability, and there is no doubt that his untimely death was largely due to overwork and that he was as much a war casualty as if he had been killed in action. In addition to being a man of outstanding professional ability, who would have distinguished himself in any branch of the profession, Moyes was a man of great human understanding. Few men of his generation can have so nearly attained the standard of the perfect doctor: his patients not only came to him with their ailments but sought advice, which they knew would be invaluable, whenever they were in a difficult situation. He gave his services to all classes of the community without any thought of reward or of his personal inconvenience. The memory of his unselfish devotion to duty, and of his warm human understanding, will remain during life with a very wide circle of patients and colleagues.

J. M. writes:

Early in his professional life Moyes joined the B.M.A. and for many years he has taken a prominent place in all its work. He has with much acceptance filled the various offices in the North Northumberland Division, and was specially successful, during the period when he was secretary, in greatly increasing the membership of the Association and in promoting enthusiasm in its work. He was a member of the Northumberland Panel Committee for many years, and at the time of his death vice-chairman. A number of years ago he was appointed chairman of the Northumberland Insurance Committee and conducted its business with dignity, and at all times promoted confidence between the profession and the laity. Moyes had a logical mind and was quick to assess the points of a question before arriving at his decision, and so clear was his reasoning that he seldom failed to carry with him those with whom he was deliberating. He was an ardent student and kept himself well abreast of the times, with the result that he was the trusted adviser of a large clientele in all walks of life. In his relations with his fellows he fulfilled the precept of the Good Neighbour: he was always ready to lend a helping hand to a colleague in time of need. Our sympathy goes out to his widow and daughter in this time of sore bereavement.

E. L. GOWLLAND, D.S.O., M.B.

We regret to announce the death of Lieut.-Col. Edward Lake Gowlland, D.S.O., for many years commandant of the Star and Garter Home for Disabled Sailors and Soldiers at Richmond and Sandgate. He died on Nov. 1, at the age of 65, in the home in which he took so much pride. He was the son of Richard S. Gowlland, chief secretary to H.M. Office of Works, and was educated at Christ's Hospital, then in the City of London, and went on for his medical training to St. Mary's. He graduated M.B.Lond. in 1901, and after holding the post of resident medical officer at Haileybury College he went into general practice at Faversham in Kent, remaining there until 1914. For many years he took a close interest in military affairs; he was a member of the Territorial Association for Kent, and from 1906 until 1915 he held a combatant commission as Major, R.G.A.(T.), commanding the Kent Heavy Battery and Ammunition Column. In 1915 he was gazetted to a temporary commission in the R.A.M.C.(T.), carried out distinguished service in the last war, and was mentioned twice in dispatches, receiving the D.S.O. in 1917. Later he was promoted lieut.-colonel commanding the County of London Field Ambulance. From 1921 to 1923 he was superintendent of the Ministry of Pensions Hospital at Orpington, and afterwards he became commandant of the splendid institution on Richmond Hill established by business men after the war as a means of alleviating those whom the war had disabled. Gowlland's professional interest was in the cases of paralysis and nerve affection resulting from war injury, and in 1934 he contributed an article to this *Journal* on the treatment of paraplegia following injuries of the spine and of disseminated sclerosis. Since 1938 he had added to his responsibilities that of emergency officer for Richmond.

Gowlland was president of the Harveian Society of London in 1933, and in 1936-7 he was chairman of the Richmond Division of the British Medical Association, which he originally joined in 1902. Among his colleagues in his local division he was much esteemed both for his organizing abilities and for his helpful and kindly manner.

Dr. JOSEPH SQUIER HINNELL died at Bury St. Edmunds on Sept. 30 in his 81st year, and in him the B.M.A. loses a loyal and active supporter and his patients and colleagues a trusted friend. Hinnell was by reason of his modesty and complete sincerity of purpose a most lovable man, who gave his 48 years of service as a general practitioner with whole-hearted unselfishness and was rewarded by the affection of all who knew him. Educated at the King Edward VI School at Bury St. Edmunds, at Pembroke College, Cambridge, and at St. Thomas's Hospital, he was a man of exceptional clinical ability, for as surgeon to the West Suffolk Hospital for 47 years he not only took his share of general surgery but built up a considerable ophthalmic department: he developed also an extensive private ophthalmic practice in addition to his work as a general practitioner. His family, his public work, his practice, and the hospital—these were the interests of Hinnell's life and he sought no others nor asked for any other recreation. The loss of his two eldest boys, both of whom were medical students, left him unembittered, and he was consoled in his later years by a happy partnership with his son-in-law. Hinnell was nothing if not an individualist, and he refused at the outset to have any truck with the N.H.I. Without ill feeling but with great firmness he stoutly refused to go on the panel at any time. Those of us who knew him best are glad for his sake that he is not called upon to take a share in planning the medical service of the future with the prospect of an increasing measure of State control. It was to Hinnell and one or two others that West Suffolk owes its Armistice Day dinner, which, starting in 1919, was for twenty years the most popular annual medical event and was supported by many of our colleagues from further afield. A full and happy life of great simplicity and generous service. We miss him from our circle but do not grudge him his rest.—B. E. A. B.

We regret to note the death on Aug. 16 at Shanghai of Dr. H. COUPER PATRICK. He was the second son of the late William Patrick, M.D., a well-known practitioner in the East End of Glasgow, and was educated in Glasgow High School and Glasgow University, where he graduated M.B., C.M. in 1895. He spent a year as house-physician and house-surgeon in the Glasgow Royal Infirmary and a winter session in Vienna, and shortly afterwards went to India to do plague and famine work in Poona. Thence he migrated to Australia, and after a few years' practice there found an opening in Shanghai, where the rest of his professional life was spent. He was resident medical superintendent of Shanghai General Hospital and surgeon to the Lester Chinese Hospital. His wife was with him at the time of his death, and it is not known whether she has succeeded in obtaining repatriation to Australia, which both she and her husband had been trying to effect in the early spring of this year. Their only daughter fortunately is safe in Melbourne. Dr. Patrick took an active part in all Scottish societies and was at one time also president of the Shanghai Medical Society. He had been a member of the B.M.A. since 1903.

Dr. WILLIAM ROBERTSON of Huddersfield died on Oct. 16 in the Royal Infirmary, where he had been taken after being knocked over by a cyclist. Dr. Robertson was born in 1878 and graduated M.B., Ch.B. at the University of Glasgow in 1902. He had been in practice at Huddersfield for some 30 years and won the Military Cross in the last war while serving with the R.A.M.C. In the present war he was medical officer of a West Riding battalion of the Home Guard. He joined the B.M.A. in 1907 and was a member of the Huddersfield Medical Society.

The New York Correspondent of the *Times* reports the death in Philadelphia at the age of 73 of Dr. EDMUND LOUIS GROS, for many years head of the American Hospital at Neuilly, France, and in 1916 one of the chief organizers of the Lafayette Escadrille. Dr. Gros, who was a Commander of the Legion of Honour, left France when the Germans invaded the country in 1940.

Medical Notes in Parliament

A new Session of Parliament was opened on Nov. 11 by the King in person. A passage in the Speech from the Throne said:

"My Ministers will continue to take all measures open to them to promote the health and well-being of My people in wartime by securing the better care of young children, by the prevention of disease, by the treatment of the sick, and by the alleviation wherever possible of the housing difficulties consequent upon the war."

An effort to improve the conditions of the peoples in the Colonies was also indicated. Proposals for better education in England and Wales and a review of the system of education in Scotland were mentioned.

The debate on the Address extended over the subsequent sittings of the House of Commons. It is hoped that time will be afforded for discussion of an amendment to the Address in the name of Prof. A. V. Hill, which is supported by many medical and lay Members. This proposes to add a declaration that the House, "while recognizing the constructive work done by the Government in building up and maintaining the health of the nation, regrets that further provision is not made for reducing the delay in applying the established results of scientific and medical knowledge to the betterment of public health and efficiency, particularly in regard to the prevention and treatment of venereal disease, the prevention of tuberculosis and other infections by the pasteurization of milk, and the prevention of diphtheria by immunization and through closer attention to factory hygiene and the health and nutrition of young people."

Nurses in Tuberculosis Sanatoria

On Nov. 10 Mr. WOOTTON-DAVIES asked the Minister of Health whether, in view of suggestions that girls should be compelled to take up sanatorium nursing and of the effort now being made to increase the number of nurses in sanatoria, he would investigate existing cases where nurses had contracted tuberculosis in the discharge of their duties and were now maintained either by public funds or on a sum which did not permit of adequate and proper care. He also asked what steps were taken to ensure the rehabilitation of nurses who contracted tuberculosis when nursing tuberculous patients. Mr. ERNEST BROWN called attention to the statement in the recent report of the Medical Research Council, that evidence from research in other countries and expert opinion in our own suggested that the risk of contracting tuberculosis from nursing tuberculosis patients in sanatoria was no greater than that involved in general hospital nursing. He added that a nurse in a tuberculosis institution who contracted the disease was customarily given every care and attention appropriate to her condition by the institution. Arrangements for care and after-care, directed to restoring working capacity, were an essential part of the tuberculosis service and applied to nurses as much as to any other person who had suffered from tuberculosis.

Anti-vaccination Activities

On Nov. 10 Prof. HILL asked the Minister of Health whether he was aware that seven anti-vivisection societies in Great Britain had between them invested capital of about £300,000 and an annual income of about £40,000 which was devoted largely to propaganda, by advertisements and otherwise, against modern scientific methods of preventive medicine; and whether, in view of the fact that eight children on the average died every day of diphtheria alone, he would take steps to counter these activities. Mr. BROWN said that local authorities and his Department had for some time been taking steps to counter these societies' activities in regard to immunization against diphtheria by the use of many forms of publicity. This publicity was continuing. In addition he had asked welfare authorities to do their best to relieve health visitors of their non-urgent routine duties, so that they might devote most of their time during the next two or three months to the immunization campaign. The President of the Board of Education had also asked local education authorities and head teachers to use their influence with parents, and to help the campaign in other ways.

Vitamin B_1 of Wheat Berry

The Parliamentary Secretary to the Ministry of Food, in reply to a question by Sir E. Graham-Little, said that his attention had been drawn to remarks made by the Ministry's scientific adviser in his recent Harben Lectures. These included reference to a recent discovery that a large proportion of the vitamin B_1 of wheat germ was contained in the scutellum which formed part of the structure of the germ itself. There was no present intention to modify in any respect the existing instructions to millers regarding the manufacture of national flour.

Air Transport of Wounded

On Nov. 10 Sir ARCHIBALD SINCLAIR informed Mr. D. Adams that in the Middle East, as in other theatres of operations, the evacuation of wounded or sick by air from the battle areas was undertaken by the Royal Air Force. Specially fitted transport aircraft were normally used for the purpose. He was advised by the Secretary of State for War that the supply of drugs and medical equipment from this country and America for the various units of the R.A.M.C. was being fully maintained.

Report of Committee on Nursing Services.—On Nov. 10 Mr ERNEST BROWN stated that he was informed by Lord Rushcliffe, chairman of the committee which was inquiring into the conditions of the nursing profession, that while he could not say with certainty when the report of the committee would be available, he hoped, in view of the considerable progress already made, that it would be possible to submit a first report early next year.

The Services

The M.C. has been awarded to Capt. J. Baron, R.A.M.C., and to Capt. A. F. Graham, R.C.A.M.C., in recognition of gallant and distinguished services in the Middle East.

CASUALTIES IN THE MEDICAL SERVICES

Capt. RONALD EDWIN SHAW LEWIS, M.C., R.A.M.C., was killed in action in the Middle East in Oct. He was born on Feb. 15, 1914, the only son of Dr. and Mrs. A. J. Lewis of Birkdale, and was educated at the University of Edinburgh, where he graduated M.B., Ch.B. in 1939. He held a house post at Dover before entering the R.A.M.C. as temp. lieut. in Feb., 1940. He was awarded the M.C. in Aug. last in recognition of gallant and distinguished services in the Middle East. During the first three days of a tank battle he was continuously going to every tank that was hit or set on fire and extricating wounded, many of whom were incapable of helping themselves. The whole of the time he was travelling in a scout car and moving about among tanks. "His devotion to duty and absolute disregard for his own personal safety were magnificent," stated the official citation. He was a member of the B.M.A.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

At a Congregation held on Oct. 31 the degrees of M.B., B.Chir. were conferred on R. M. Stuart Matthews.

During October titles of the degrees of M.B., B.Chir. were conferred on G. E. L. Cummins of Newnham College.

UNIVERSITY OF LONDON

The Senate of the University has appointed David Randall Pye, Sc.D., F.R.S., Director of Scientific Research at the Ministry of Aircraft Production, to the post of Provost of University College, London, vacant through the death of Sir Allen Mawer. Dr. Pye will enter upon his duties on Jan. 1, 1943.

UNIVERSITY OF ABERDEEN

The General Council of the University has appointed Robert Richards, M.D.Aberd., F.R.C.S.Ed., lecturer in forensic medicine, to fill a vacancy on the Business Committee.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

At a quarterly meeting of the College, held on Nov. 3, with the President, Dr. Charles McNeil, in the chair, Dr. Wm. George Clark was introduced and took his seat as a Fellow of the College, and Dr. P. A. H. King, D.F.C., Dr. J. G. Sclater, Dr. Adam Patrick, and Dr. J. W. McNee, D.S.O., were elected Fellows. The Hill Pattison-Struthers Bursary in Anatomy and Physiology was awarded to A. Jardine Neil.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW

Prof. H. J. Seddon will deliver a lecture on "Recent Work on Peripheral Nerve Injuries" under the auspices of the Dr. John Burns Fund in the hall of the Faculty (242, St. Vincent Street, Glasgow) on Wednesday, Nov. 25, at 4 p.m.

No. 43

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Oct. 31.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1942 (a)	(b)	(c)	(d)	(e)	1941 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	57	3	17	3	1	88	5	38	1	7
Deaths		—	3		—		—	3		—
Diphtheria	898	35	273	101	22	1,017	51	277	56	33
Deaths	14	1	—	2	—	31	3	6	2	1
Dysentery	290	12	52		—	139	16	95		—
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	3	—	6	—	—	2	—	—	—	—
Deaths		—	—				1	—		
Erysipelas		—	47	4	4		—	52	8	2
Deaths		—	—		—		—	—		—
Infective enteritis or diarrhoea under 2 years				42						
Deaths	47	5	12	29	2	56	3	16	25	4
Measles	6,812	288	292	24	16	745	52	23	50	3
Deaths	4	—	2	—	—	—	—	—	1	—
Ophthalmia neonatorum	83	3	34	3	—	77	5	20		1
Deaths										
Paratyphoid fever	7	—	2	—		53	3	4	—	
Deaths	—	—	—	—	—	—	—		—	
Pneumonia, influenzal*	582	43	2	1	2	631	28	6	—	1
Deaths (from influenza)	11	1	2	2	—	15	22	2	—	6
Pneumonia, primary			156	16				160	9	
Deaths		—		10	7		—		7	—
Polio-encephalitis, acute	4	—				4	—			
Deaths		—					—			
Poliomyelitis, acute	27	1	1	17	—	50	5	8	—	—
Deaths		—	—				—	—		
Puerperal fever	—	1	16	2	2	1	1	7	2	—
Deaths		1					—			
Puerperal pyrexia	145	4	13		2	142	7	16		4
Deaths										
Relapsing fever	—	—			—	1	1			—
Deaths										
Scarlet fever	2,583	129	433	61	56	1,224	37	250	57	19
Deaths	1	1	1	—	—	2	—	—	—	—
Small-pox	—	—	—	—	—	—	—	—	—	—
Deaths		—	—	—	—		—	—	—	—
Typhoid fever†	12	—	2	5	1	23	3	3	7	9
Deaths	—	—	—	—	—	—	—			1
Typhus fever	—	—	—	3	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	1,015	81	38	25	3	1,985	214	67	21	3
Deaths	8	1	—	1	—	16	2	2	—	—
Deaths (0–1 year) Infant mortality rate (per 1,000 live births)	306	45	64	47	12	299	27	63	41	21
Deaths (excluding still-births)	3,834	584	517	182	111	3,867	530	520	177	99
Annual death rate (per 1,000 persons living)			11·6	12·2	‡			11·3	11·8	‡
Live births	5,497	643	770	363	265	5,308	467	933	294	208
Annual rate per 1,000 persons living			15·9	24·2	‡			19·0	19·5	‡
Stillbirths	227	25	32			176	20	32		
Rate per 1,000 total births (including stillborn)			40					33		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes paratyphoid A and B for Northern Ireland.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* during the week the outstanding feature was the very large rise of 113 cases in the incidence of dysentery. There was a drop of 73 and 77 in the totals for diphtheria and acute pneumonia respectively.

The southern section of the country was responsible for the decline of 36 in the notifications of scarlet fever. In some of the northern counties there was a decided rise, the largest being 68 in Lancashire.

A small fall in the incidence of diphtheria was fairly general throughout the country, the principal exceptions being increases in Lancashire and Wales of 32 and 22 cases respectively.

Although there were only 9 more cases of measles, there were large variations within the counties. The biggest of the increases were those of Yorks West Riding 178, Flint 67, Glamorgan 62, Surrey 58, Durham 41; and the largest falls those of Derby 90, London 72, Lancashire 55, and Leicestershire 53.

The rise in the incidence of dysentery was accounted for by the outbreak in Caernarvon, where 151 cases were reported in the rural district of Nant Conway. Elsewhere the decline was general, although the outbreaks in the West and North Ridings remained high, with 22 and 28 cases respectively—in the former, cases occurred in six administrative areas; and in the latter all the cases were in Middlesbrough C.B. The outbreak here, which began during the week ending Sept. 19 with 8 cases, has resulted in 153 cases up to the week under review.

In *Scotland* the incidence of diphtheria and scarlet fever remained at a high level, but there were 87 fewer notifications of measles. This decrease was fairly general, the principal exceptions being in the burghs of Glasgow and Kirkcaldy with rises of 12 and 21.

In *Eire* the notifications of diphtheria rose from 76 to 101, the cases being recorded from thirty areas. The 17 cases of acute poliomyelitis constituted the lowest weekly total for seven weeks. Three further cases of typhus were reported from the rural district of Galway, Co. Galway.

Small-pox

Ten further cases of small-pox have occurred in Edinburgh during the week, bringing the total up to 18. The number of persons vaccinated is over 150,000. The danger of the "missed" or "unrecognized" cases of small-pox, arising from a very mild attack, has been stressed by the Chief Medical Officer for the Department of Health for Scotland in a Press appeal to the public.

Returns for the Week Ending November 7

The returns of infectious diseases for England and Wales during the week included: scarlet fever 2,736, whooping-cough 965, diphtheria 881, measles 7,384, acute pneumonia 543, cerebrospinal fever 65, acute poliomyelitis 18, dysentery 142, paratyphoid 6, typhoid 6.

Medical News

Dr. Alexander Edward Gow, F.R.C.P., has been appointed Honorary Physician to the Household of H.R.H. the Duchess of Kent.

Sir J. Donald Pollock, Bt., M.D., LL.D., has been re-elected Rector of Edinburgh University by a very large majority.

A meeting of the Medico-Legal Society will be held at 26, Portland Place, W., on Thursday, Nov. 26, at 4.15 p.m., when Mr. D. Harcourt Kitchin will read a paper on "Some Legal Aspects of Medical Practice."

At a meeting of the London and Home Counties Region of the Child Health Planning Group on Saturday, Nov. 28, at 2.15 p.m., at 13, Hill Street, Berkeley Square, W., Dr. Margaret Wright will open a discussion on "Strong and Weak Points in the Present Feeding of Children."

The Anglo-Soviet Medical Council is holding a reception in London on Monday, Nov. 23, when Madame Maisky will be presented with *Reviews of British War Medicine* and the Hon. Ivor Montagu will speak on "Scientific and Educational Films in the U.S.S.R."

Health visitors are to be relieved of routine work and instead are to devote their time to securing that all children under 5 are immunized against diphtheria. It is estimated that by this means 80% to 100% of children between 1 and 5 will be immunized before the end of the winter.

The facilities of the Emergency Blood Transfusion Service are to be made available to welfare authorities for maternity cases, provided this does not interfere with the primary work of the service—blood transfusion in war casualties. No charge will be made for fluid given or for apparatus loaned, but welfare authorities will be expected to make their own arrangements for transport and to meet all other expenses. (Ministry of Health Circular 2712.)

On Nov. 7 Sir Alexander Macgregor, Medical Officer of Health for Glasgow since 1925, was presented with his portrait in oils in recognition of the knighthood conferred upon him. Dr. R. J. Peters, deputy M.O.H., presided over a large gathering. The portrait, by Mr. W. O. Hutchison, A.R.S.A., was the gift of the members of the staff in the public health department, and it was formally handed over by Col. William C. Gunn, senior assistant M.O.H. In his acknowledgment Sir Alexander Macgregor mentioned that he had been in the department for 37 years, and since he became its head the staff had increased from 1,900 to over 6,000, while the number of hospital beds had multiplied fivefold. He hoped that after the war the department would not be subjected to excessive organization. In their work they came into contact with the daily life of citizens, and he did not want any red tape connected with it.

The Silver Thimble Fund is appealing for help in endowing a ward of ten beds in a Malta hospital; it costs £1,000 to endow and name one bed. This fund has already done much for the sick and wounded (a similarly named fund raised £60,467 in the last war), and it asks for donations and/or old silver thimbles, any broken and unwanted silver or gold trinkets, etc., which should be sent to the fund at 17, High Street, Wimbledon Common, S.W.19.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1.

ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

Authors desiring REPRINTS should communicate with the Secretary of the Journal Board, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

ADVERTISEMENTS should be addressed to the Advertisement Manager (hours 9 a.m. to 5 p.m.). Orders for copies of the *Journal* and subscriptions should be sent to the Secretary.

TELEPHONE No.—B.M.A. and *B.M.J.*: EUSTON 2111.

TELEGRAPHIC ADDRESSES.—EDITOR, *Aitiology Westcent, London;* SECRETARY, *Medisecra Westcent, London.*

B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.

QUERIES AND ANSWERS

Reconditioning of Corks

R. B. writes: In reply to Dr. C. Heap (Oct. 31, p. 534), the following process produces corks quite fit to use. I keep an old calico bag hanging in my dispensary (a bag in which one used to buy 7 lb. of dog biscuits), and in this used corks are collected as they are handed back. When the bag is about three-quarters full a blob of soft soap, or a small lump of ordinary soap, or a handful of soap flakes or powder is put in and the neck of the bag tied with a piece of string. The corks must not be tightly packed but loose enough to allow plenty of movement and friction. The bag is then immersed in a basin of hot water and thoroughly rubbed and pounded and worked about. Dr. Heap will be surprised at the amount of dirt which comes out, for one or two fresh lots of water are needed before colour ceases to come out of the bag. The bag is then hung up to drain and the corks can later be dried on a newspaper in the sun and will be of a uniform light brown colour, fit to use. If it is desired to make the corks a little paler they can be tipped into a bowl or jar and left for some hours with some hydrogen peroxide, which is stirred up or shaken up over them occasionally, to keep them moist. I dare say a stronger bleaching agent could be used, but then the corks would need washing again afterwards.

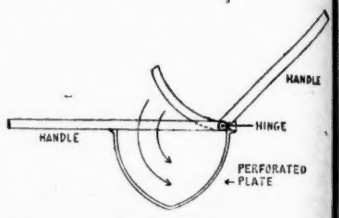
Dr. M. E. LAMPARD (Colchester) writes: In reply to Dr. C. Heap's inquiry, it is possible to bleach corks by soaking them in very weak hydrochloric acid.

"X. Y." writes: Greasy corks must be treated with a suitable solvent first. For corks which are not greasy the following method bleaches and cleans them satisfactorily. Soak in 10% hydrochloric acid for half an hour, then immerse for another half-hour in a solution of sodium hyposulphite acidified with hydrochloric acid. Finally wash in soda and water.

LETTERS, NOTES, ETC.

Device for Making Fomentations

Dr. GEOFFREY G. AIREY (Ledbury) writes: I have recently been using a device for the preparation of hot fomentations which may be of interest to some of your readers. It eliminates a great deal of the trouble in preparing this type of dressing and saves time, as well as material and the nurses' hands. The material saved is, of course, the towel containing the dressing, as that nearly always gets into the flame of the gas burner. The device is nothing more romantic than the ordinary domestic potato-masher, as shown in the illustration. Where many of these dressings have to be done daily there is a great saving of time. The lint is, of course, put into the cage of the masher, which is immersed in the boiling water.



Treatment of Impetigo

Dr. T. PIRES writes from Burnham-on-Sea: I would like to endorse Dr. Simpson Smith's findings (Nov. 7, p. 560) in the treatment of impetigo with liq. ferri perchlor. fort. The application can be made over scabs. The infection is arrested and the period of infectivity considerably shortened, the normal skin being in no way affected. In the case of persistent scabs applications should be renewed when a hyperaemic condition develops, "washing off" the scab, as it were. In some cases where a ring of "rolled edge" persists after the scab falls off, this should be painted round with liq. ferri perchlor. solution. The effectiveness of the method commends it even more than the saving of expenditure.

Roche Products Limited, Welwyn Garden City, Herts, have published a second edition of their pamphlet *Vitamins in Medical Practice*. The text has been enlarged and new illustrations added. In accordance with the Paper Control Regulations a charge of 9d. a copy is made; all the money collected in this way will be set aside for one or two medical charities or the Red Cross.

MEDICINE 100 YEARS AGO

Extracts from a leading article in the *Provincial Medical Journal* of November 19, 1842 (the forerunner of the *British Medical Journal*):

"The poor-law commissioners have recently published, through the medium of their secretary, Mr. Chadwick, a very elaborate report on the sanatory condition of the laboring population of Great Britain. It might fairly be asked, *in limine*, how the direction of so difficult and complex an investigation was entrusted to a gentleman completely ignorant of the subject submitted to his inquiry: how a poor-law secretary—unacquainted with the most simple laws of the human economy, and possessing not a particle of that preliminary knowledge which is essentially necessary to every one commencing a special investigation—should take upon himself to examine facts and form conclusions connected with the public health. Such, however, has been the case; and as 'her Majesty's principal Secretary of State for the Home Department' has thought fit to select Mr. Chadwick for the purpose of inquiring into the sanatory condition of the people, we shall endeavour, as loyal subjects, to regard the selection as a fitting one, and to pay all due deference to opinions which emanate from so high an authority.

"Our ideas of fitness and the promptings of common sense are, indeed, wonderfully disturbed by the appearance of Mr. Chadwick as an authority on hygiene; and the necessity of noticing his report places us in the awkward position condemned by the proverb, of endeavouring to 'make a silk purse of a ——' etc.; but to this necessity we submit, because we must take Mr. Chadwick's report or have no report at all. This conclusion is inevitable. The poor-law commissioners have resolved, *inter alia*, on seizing by anticipation on the duties of a board of health, on constituting themselves into a council for the regulation of all matters connected with public hygiene; and the present report is evidently put forth as a feeler upon this matter. To have entrusted the report to any medical man, or any body of medical practitioners, would not have suited the views of the commissioners; they accordingly forced their secretary upon Lord John Russell, employed themselves diligently in the collection of a vast body of facts, and now come before the public and the government with an official report on the causes and prevention of disease amongst the laboring classes.

"The observations which we have just made are rather addressed to the source whence Mr. Chadwick's report has emanated than to the report itself, which, on the whole, is creditable to the industry of its author."